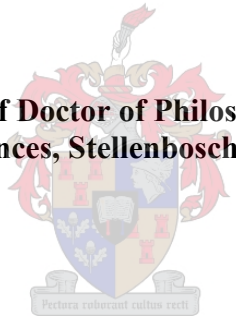
TESTING THE THEORY OF PLANNED BEHAVIOUR IN PREDICTING CONDOM USE IN EASTERN GHANA: A THREE-WAVE LONGITUDINAL STUDY

Enoch Teye-Kwadjo



Dissertation presented for the degree of Doctor of Philosophy (Psychology), Faculty of Arts and Social Sciences, Stellenbosch University

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Abstract (English)

Although young people's sexual-risk behaviour raises public health concerns in Ghana, there is, however, little theory-guided research investigating this health problem empirically. This study tested the theory of planned behaviour's (TPB) efficacy to explain intended condom use and self-reported condom use, using latent variable structural equation modelling. Public senior high school students (N = 684) aged 14-20 years from eastern Ghana completed measures based on the TPB's components across three measurement occasions, spaced approximately three months apart. Consistent with the TPB, latent variable structural equation models showed that attitudes were positively associated with intended condom use over time. Subjective norms and perceived behavioural control were, however, not statistically significantly associated with intended condom use over time. Moreover, intended condom use was not significantly associated with self-reported condom use behaviour over time. Other analyses revealed that gender moderated the TPB components. These results highlight the importance of focusing adolescent sexual risk reduction programmes on intra-individual attitude formation and activation. The current data partially validate the TPB as a fairly robust model to guide the design of adolescent sex education programmes in eastern Ghana. The practical, theoretical, and the methodological implications of these results are discussed.

Keywords: theory of planned behaviour, longitudinal study, structural equation modelling, adolescents, condom use, attitude, Ghana

Opsomming (Afrikaans)

Alhoewel jongmense se seksuele risikogedrag besorgdheid oor openbare gesondheid in Ghana laat ontstaan, is daar min teoriegebaseerde navorsing wat hierdie gesondheidsprobleem empiries ondersoek. Hierdie navorsing het die doeltreffendheid van die teorie van beplande gedrag (TBG) getoets ten einde voorgenome kondoomgebruik en selfgerapporteerde kondoomgebruik met behulp van strukturele vergelykingsmodellering met latente veranderlikes te verduidelik. Hoërskoolleerders aan staatskole (*N* = 684) in die ouderdomsgroep 14-20 jaar uit die suidelike deel van Ghana het meetinstrumente met tussenposes van ongeveer drie maande en gebaseer op die komponente van TBG oor drie metingsgeleenthede heen voltooi. In ooreenstemming met die TBG het strukturele vergelykingsmodelle met latente veranderlikes getoon dat gesindhede mettertyd ’n positiewe verband met voorgenome kondoomgebruik getoon het. Subjektiewe norme en waargenome gedragsbeheer is egter ná verloop van tyd nie statisties beduidend met voorgenome kondoomgebruik verbind nie. Daarbenewens is voorgenome kondoomgebruik nie gaandeweg met beduidende self-gerapporteerde gedrag rakende kondoomgebruik verbind nie. Ander analises het aan die lig gebring dat geslag die TBG-komponente gunstig beïnvloed het. Hierdie resultate beklemtoon die belang daarvan om op programme met betrekking tot adolessente se seksuele risiko ten opsigte van die vorming van intra-individuele gesindhede en aktivering te konsentreer. Die huidige data bevestig gedeeltelik die TBG as ’n redelik robuuste model as gids by die ontwerp van geslagsvoorligtingsprogramme vir adolessente in die suidelike deel van Ghana. Die praktiese, teoretiese en metodologiese implikasies van hierdie resultate word bespreek.

Sleutelwoorde: teorie van beplande gedrag, longitudinale studie, strukturele vergelykingsmodellering, adolessente, kondoomgebruik, gesindheid, Ghana

DECLARATION

By submitting this dissertation electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by Stellenbosch University will not infringe any third party rights and that I have not, previously, in its entirety or in part, submitted it for obtaining any qualification.

Signature:___**ETK**____

Date: **August 7, 2014**

DEDICATION

For my family—*Franklin, Valerie, and Vida*.

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It is not often that doctoral students get the chance to have two supervisors guide their doctoral studies from beginning to end, because it is well known that "two cannot walk except they agree". Nonetheless, that was precisely the chance I had and thus, changing the popular maxim from "two cannot walk except they agree" to "*three* cannot *work* except they agree"—Prof Ashraf Kagee (American-trained professor), Dr Hermann Swart (British-trained doctor), and me (Norwegian-trained master student). Indeed, it was a privilege for me to work with Prof Ashraf Kagee and Dr Hermann Swart—two academics with unlimited passion for scientific quality and best psychological practices. Through the insightful comments and watchful eyes of Prof Ashraf Kagee and of Dr Hermann Swart, I have *seen* the "big picture" of scientific quality relative to psychological science. For this, Prof Ashraf Kagee and Dr Hermann Swart, I am most grateful to you.

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library and the ever-growing list of new journals added to the library's collections facilitated the completion of my doctoral dissertation in record time.

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LIST OF ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
DHS	Demographic and Health Survey
HIV	Human Immunodeficiency Virus
MDG	Millennium Development Goals
SEM	Structural Equation Modelling
STD	Sexually Transmitted Disease
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNESCO	United Nations Organisation for Education, Science and Culture
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
WHO	World Health Organization

Chapter I

INTRODUCTION

Background to the Study

Young people's sexual behaviour raises public health concerns worldwide. Many young people in Ghana face sexual health threats. This is because they are increasingly initiating sexual debut at earlier ages, often without protection (Ghana Aids Commission, 2012; Odonkor, Nonvignon, Adu, Okyere, & Mahami, 2012). Recent national sentinel surveys estimated that the HIV prevalence rate among 15-19 year-olds rose from 1.1% in 2010 to 1.9% in 2011 (Ghana Aids Commission, 2012). Increasing prevalence of sexually transmitted diseases (STDs) and of unintended pregnancy has also been recorded among young people in Ghana (Ghana News Agency, 2012; Morhe, Tagbor, Ankobea, & Danso, 2012; Ohene & Akoto, 2008). This sexual health problem comes against the background that young people below the age of 15 years represent 38.3% of the total population of over 24 million Ghanaians (Ghana Statistical Service [Census 2010], 2012). Young women aged 10-24 years alone account for a proportion of 31.4% of the total female population. Young men in the same age group represent 32.4% of the total male population (Ghana Statistical Service [Census 2010], 2012).

The relationship between sexual health and reproductive health is a strong one. Sexual health is therefore a key indicator of an individual's quality of life (Editorial, 2013). The influence of sexual behaviour on an individual's sexual health in general is substantial. Young people's sexual behaviour poses public health challenges because it is associated with several consequences which include the risk of HIV, unintended pregnancy, and other sexually transmitted diseases (STDs) such as syphilis, chlamydia, and gonorrhea (Centres for Disease Control and Prevention, 2013; Chandra-Mouli, McCarraher, Phillips, Williamson, & Hainsworth, 2014; Eaton et al., 2012; Potterat, Brewer, Gisselquist, & Brody, 2012; Reed & Huppert, 2011; Sedgh et al., 2006; Zabin & Kiragu, 1998;

UNICEF, 2011). In addition, global changes in societal and behavioural patterns, such as a reduction in the age at menarche (Aksglaede, Olsen, Sørensen, & Juul, 2008; Cho et al., 2010; Euling et al., 2008; Glynn et al., 2010; L'Engle, Brown, & Kenneavy, 2006; McDowell & Brody, 2007; Ong, Ahmed, & Dunger, 2006; Parent et al., 2003), have placed young people at increased sexual health risks, requiring effective sexual health research (Bearinger, Sieving, Ferguson, & Sharma, 2007). For example, research shows that once infected with STDs young people have a greater risk of contracting HIV (Fleming & Wasserheit, 1999; Galvin & Cohen, 2004; Grosskurth et al., 1995; Korenromp et al., 2005; Mayaud & Mabey, 2004). Other related data indicate that in settings with high HIV prevalence rates, young people have higher odds of being infected with HIV and STDs (Chandra-Mouli et al., 2014). For this reason, a clearer understanding of young people's sexual behaviour patterns is needed. This understanding may inform the design of accurate contraceptive information and sex education programmes for young people in order to help them negotiate sexual behaviour with less negative outcomes.

Relatedly, the ever-changing patterns of youth sexual behaviour practices resulting from social media (Lo & Wei, 2005; Owens, Behun, Manning, & Reid, 2012), technological advancement (Dake, Price, Maziarz, & Ward, 2012; Drouin & Landgraff, 2012; Ferguson, 2011; L'Engle et al., 2006), and from the reported reduction in the age at menarche globally (Aksglaede et al., 2008; Cho et al., 2010; McDowell & Brody, 2007), provide a justification for the recent interest in using logically consistent theoretical models to guide youth sexual behaviour research and interventions. A key strategy is to target behavioural factors that have been empirically demonstrated to be amenable to change (Diclemente et al., 2008; Michie & Abraham, 2004; Michie, van Stralen, & West, 2011; Montanaro & Bryan 2014). In the section that follows I describe the key issues that make young people's sexual behaviour in Ghana a problem that warrants investigation.

Statement of the Problem

Early sexual behaviour is on the rise among young people in Ghana (Abbey, 2012; Adu-Mireku, 2003; Ghana Aids Commission, 2012; Odonkor et al., 2012). It is well known that early sexual debut is a precursor to sexual risk-taking in later life. Related to this, unsafe abortion among adolescent women in Ghana, resulting from unintended pregnancy, was reported to be increasing and contributing to high maternal death rates (Aniteye & Mayhew, 2013; Bokpe, 2012; Guttmacher Institute, 2010; Mills, Williams, Wak, & Hodgson, 2008; Morhee & Morhee, 2006; Schwandt et al., 2010; 2013). In a cross-sectional study among 894 school-going adolescents (56.9% young women; 43.1% young men) from two public senior high schools in Accra, Ghana, Adu-Mireku (2003) found that 25% of students reported being sexually active. Of these, 64.7% reported initiating first sexual activity at age 16 years and 55.7% reported not using condoms at their last sexual intercourse.

Whereas the incidence of new infections of HIV has declined among the general Ghanaian population, it is reported to be rising sharply among young people, especially those of school-going age. For example, the HIV prevalence rate among young people aged 15-19 years was 1.1% in 2010 but this rose to 1.9% in 2011 (Ghana Aids Commission, 2012). Additionally, cases of STDs and unintended pregnancy were reported to be on the rise (Morhe et al., 2012; Ohene & Akoto, 2008). As a result, many young Ghanaians have withdrawn from school. These problems pose serious mental health challenges to the well-being of young people, their families, and society. A related problem is that HIV-related data are usually presented nationally and regionally in the demographic and health surveys (DHS) with little town-specific information in most cases. This presentation style serves to inhibit the design of targeted and context-specific sex education prevention programmes.

Further, Ghanaian youths' reported lack of interest in using condoms may stem from the government's inability to make condoms available to young people at places where they could conveniently find them. Abdul-Rahman, Marrone and Johansson (2011) reported that private drug

stores were the major sources for obtaining condoms in Ghana. For example, Abdul-Rahman et al. (2011) revealed that more than 75% of their sample reported purchasing contraceptives, including condoms, from privately owned pharmacies in 2003; and nearly 60% of young women reportedly purchased the same from private pharmacies in 2008. This situation seems to worsen the health problem of Ghana, a country with a generalised HIV epidemic and increasing cases of adolescent pregnancy and STD infection.

Despite these problems, young people's sexual behaviour remains understudied in Ghana. Young people's sexual behaviour research is crucial because good adolescent health predicts good adult health (Sawyer et al., 2012). This knowledge, for the most part, explains why health psychologists and other allied professionals have long been interested in understanding young people's sexual health cognition and behaviour (Basen-Engquist, 1992; Boyer & Kegeles, 1991; Breakwell, Millward, & Fife-Schaw, 1994; Ferguson, 2013; Jemmott, 2000). Not only is this interest because of the negative health outcomes associated with young people's sexual behaviour practices, but also because young people's sexual risk behaviour affects the entire society, with implications for the next generation. As can be expected, this interest has focused on identifying psychosocial factors that determine young people's sexual risk behaviour (Fisher, Fisher, & Rye, 1995; Hutchinson, Sosa, & Thompson, 2001; Hutchinson & Wood, 2007; Lewis, Malow, & Ireland, 1997; Pedlow & Carey, 2004; Rise, 1992; Shafer & Boyer, 1991).

Unfortunately, in Ghana, interventions to reduce young people's sexual risk behaviour have failed to address the problem because they have been largely based on non-governmental organisation (NGO) initiatives that were not informed by sound scientific research. A related problem is that sentinel surveys (which are carried out every 4 years) and demographic and health surveys remain the major means of gauging incidence and prevalence of HIV/STD infections among young people in Ghana. On the one hand, data suggest that the demographic and health surveys are not comprehensive

enough because in 2003 and 2008 only a total of 360 young women aged 15-19 years were sampled nationally. These findings also provide some support for the views held by many Ghanaians that the national demographic and health survey data produced were somewhat fraught with under-reporting and under-recording.

On the other hand, the health sentinel surveys in Ghana appear to suffer similar limitations and they, therefore, mask the real picture of young people's sexual activity. With 91% of in-school adolescent women reported to be sexually abused (Abbey, 2012; Ghana News Agency, 2014a), it seems inconceivable how only 9% of young women aged 15-24 years reported engaging in sexual activity before reaching age 15 years in 2011 as reported by the Ghana Aids Commission (2012). These non-representative data obscure our understanding of the true magnitude of young people's sexual risk behaviour. This paucity of research has made it impossible to get accurate estimates of unintended pregnancy, STD, and HIV incidence and prevalence rates among young Ghanaians. Consequently, the actual psychosocial drivers for unprotected sexual behaviour of young people in Ghana are not known. From the afore-mentioned, it seems clear that we need to identify and to explain the determinants of young people's sexual risk behaviour. The need to understand determinants of sexual risk behaviour of young people in Ghana is consistent with preventive public health goals. In Ghana, planning youth sex education programmes would require new research into young people's sexual behaviour patterns and their risk for unintended pregnancy and other STDs.

Unfortunately, the HIV awareness creation programmes such as "Know Your Status Campaign", "HIV ALERT programme", and "ABC Campaign" (Ghana Aids Commission, 2012; Lund & Agyei-Mensah, 2008) that have been put in place by central government and NGOs have had little impact on young people's sexual behaviour. This is because, although they increased HIV knowledge among young people, this knowledge rarely translated into attitudinal and behavioural change (Appiah-Agyekum & Suapim, 2013). For the most part, these sexual-risk reduction programmes are not

producing the much needed behavioural change because they have not been guided by theoretical models. Consequently, the findings from these programmes seem primarily speculative. Due to the limited explanatory value of these interventions, the bigger picture of condom-protected sexual behaviour skills and beliefs of school-going youths in Ghana remains largely unknown. As a result, the relationship between young people's attitudinal, normative, and control beliefs to their sexual risk behaviours also remains an unanswered question. A major problem is that HIV-risk preventive education programmes in high schools in Ghana do not offer free condoms to students. Also, condoms are not placed in washrooms or at other vantage points where sexually active students can access them. Therefore, it appears unlikely that senior high school students in Ghana can actually obtain condoms if they needed them. This problem warrants investigation.

Eastern Ghana and HIV. Eastern Ghana is one of the ten administrative regions of Ghana most affected by HIV (Ghana Aids Commission, 2012). For example, as with previous years, in 2010 the highest HIV prevalence rate of 3.2% was recorded in eastern Ghana. In 2011, central Ghana experienced the highest HIV prevalence rate of 4.7% followed by eastern Ghana with 3.6% (see Figure 1). Given this, young people in this setting may experience individual-level and societal-level risks of HIV and other STDs. It therefore seems practically relevant to understand how young people in this region perceive their risk of HIV infection and other STDs, what HIV-risk reduction behaviours they engage in, and whether social norms in this setting have any influence on their health-enhancing behaviour change. This information may help guide the design of behavioural interventions in response to these perceptions, beliefs, and social norms. These reasons and other considerations discussed in later sections of this chapter motivated the choice of eastern Ghana as the setting for this study. In addition, fertility surveys in eastern Ghana and Greater Accra region among 1,782 young people reported that 66.8% of young men and 78.4% of young women were sexually experienced (Agyei, Biritwum, Ashitey, & Hill, 2000).

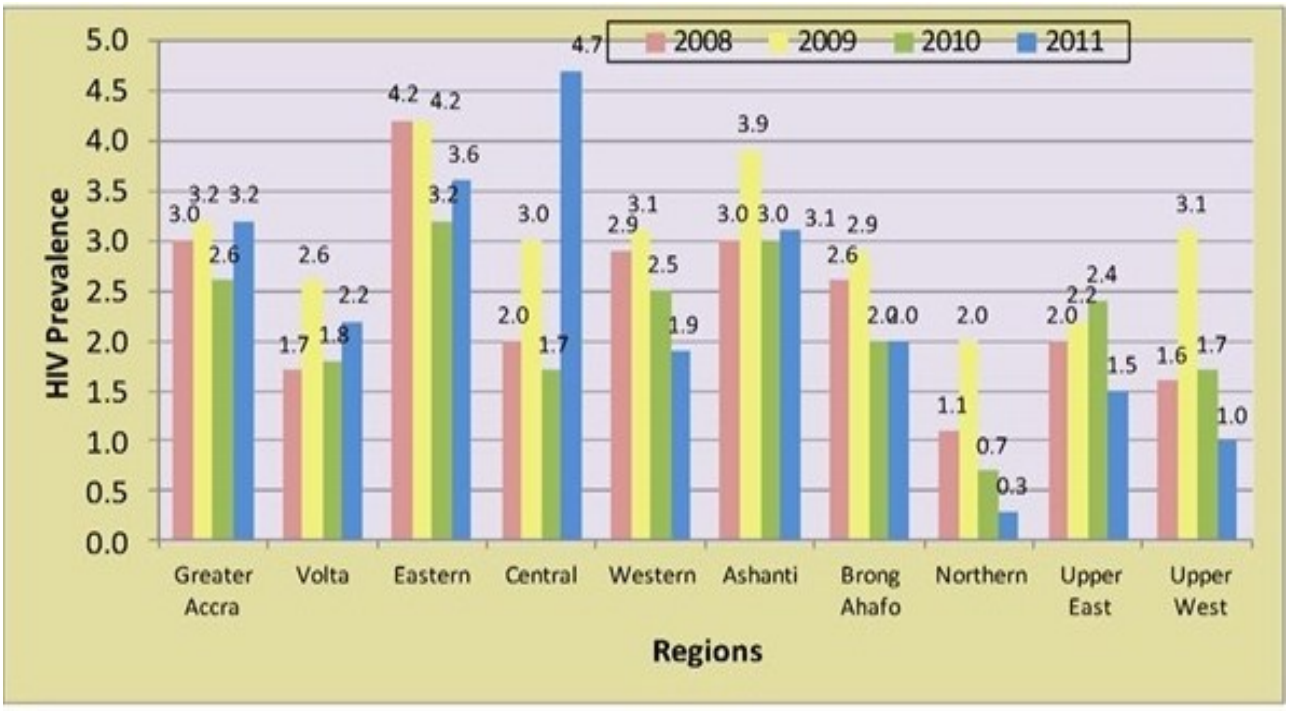

Figure 1: HIV prevalence by ten administrative regions of Ghana. Reproduced from "Ghana Country AIDS Progress Report," by Ghana Aids Commission, 2012, Retrieved from http://www.unaids.org/en/dataanalysis/knowyourresponse/countryprogressreports/2012countries/ce_GH_Narrative_Report[1].pdf, p. 22.

Related to this, previous data on sexual debut among young people in the ten administrative regions of Ghana showed that 55% of young women in eastern Ghana were more likely to commence sexual intercourse before reaching 18 years of age than were their peers in other regions (Ghana Statistical Service/Ghana Health Service, 2009). These data also revealed that 1 in 5 young women aged 15-24 years in eastern Ghana reported an STD case or a symptom of STD.

Furthermore, it is estimated that 1 in 20 young eastern Ghanaians resides in a home where someone is either diagnosed with HIV, has died of AIDS, or has undetected HIV (Ghana Statistical Service/Ghana Health Service, 2009). Residing in community settings where many people are known to be living with HIV may pose risks of poor psychological functioning (e.g., emotional distress) for young people. Literature suggests that young people growing up in settings characterised by high HIV incidence are more likely to experience higher levels of anxiety, social phobia, and cognitive

vulnerability. They are also more likely to face conduct and psychological adjustment problems, requiring the attention of psychologists. Young people who reside in homes in eastern Ghana, in which cases of HIV infection were diagnosed or HIV-related mortality occurred, may most likely experience depression as well.

For example, an empirical investigation in eastern Ghana to assess the influence of parental HIV status and death on orphan adolescents' ($N = 200$) psychological wellbeing, revealed that compared with adolescents whose parents died of other causes, adolescents whose parents died of HIV/AIDS and those living with parents infected with HIV experienced greater peer adjustment problems (Doku, 2009; 2010). Whereas the entire sample showed low levels of hyperactivity, Doku (2009; 2010) found that all three groups reported high levels of conduct and emotional problems. Moreover, in Ghana data show that many school-aged sexually active heterosexual young people do not engage in condom-protected sexual behaviour. For instance, of 82% of young people aged 15-30 years in Ghana found to be sexually experienced, only 24% of them reported using condoms at their last sexual intercourse (Ghana Aids Commission, 2012; Karim, Magnani, Morgan, & Bond, 2003).

Meta-analyses and systematic reviews have long established that condoms can achieve 87% success in preventing pregnancy (Trussel & Kost, 1987). About 69% of heterosexual transmission of HIV can also be reduced by condom use among discordant sexual partners who are HIV-positive (Weller, 1993). Recent research reported that consistent condom use could prevent sexually transmitted HIV by between 87% and 96% (Davis & Weller, 1999; Pinkerton & Abramson, 1997; Weller & Davis-Beaty, 2002). Arguably, condoms still remain the most cost-effective means of HIV, STD, and unintended pregnancy prevention for sexually experienced youth (Creese, Floyd, Alban, & Guinness, 2002; Maticka-Tyndale, 2012; Valadez et al., 2014; Widman, Noar, Choukas-Bradley, & Francis, 2014), especially in resource-limited countries. Given these findings, it seems clear that new and more

innovative approaches for gaining insight into young people's sexual practices in Ghana are urgently needed. Defined next are the aims and objectives of this study.

Research Aims and Objectives

Aims of the study. The aims of the current research were to:

(a) undertake a three-wave longitudinal study (panel analysis) to test the theory of planned behaviour's efficacy to predict intended condom use and self-reported condom use over time among heterosexual senior high school students in eastern Ghana;

(b) identify the most influential components of the theory of planned behaviour that help to explain and to predict sexual-risk preventive intentions and behaviour of young Ghanaians;

(c) examine empirically the predictive efficacy of the theory of planned behaviour using latent variable structural equation modelling in order to validate and to extend it as a socio-cognitive model for studying psychosocial predictors of condom use, and for designing youth sexual-risk reduction programmes in eastern Ghana;

(d) fill a methodological void in the theory of planned behaviour literature by testing the full longitudinal mediation implied by the theory of planned behaviour; and

(e) examine if gender (as an independent variable) influences scores on components of the theory of planned behaviour (as dependent variables) in the Ghanaian sample.

Specific objectives of the study. The specific objectives of this study were to:

(a) measure attitudes towards condom use, subjective norms regarding condom use, perceived behavioural control regarding condom use, behavioural intentions towards future condom use, and self-reported condom use among Ghanaian high school students at three-time points, spaced approximately three months apart;

(b) examine whether attitudes, subjective norms, and perceived behavioural control at Time 1 (i.e., baseline assessment) predict behavioural intentions at Time 2 (i.e., 3 months later, after controlling for the autoregressive effects of behavioural intentions at Time 1); and

(c) determine whether behavioural intentions at Time 2 predict condom use behaviour at Time 3 (i.e.,6 months later, after controlling for the autoregressive effects of condom use at Time 1 and Time 2).

Rationale of the Study

Set of reasons for this study. The following set of reasons constitutes the rationale of the current study. First, unprotected sexual behaviour increases an individual's risk of contracting disease, of suffering long term disability, and of dying in an era of HIV and other STDs (Lopez, Otterness, Chen, Steiner, & Gallo, 2013). Further, the three new pillars of the "2011-2015 Vision Zero" strategy of the Joint United Nations Programme on HIV/AIDS [UNAIDS] (2010) set various targets that all member countries (including Ghana) should have achieved by 2015. These targets include (a) zero new infections of HIV, (b) zero discrimination, and (c) zero HIV/AIDS-related deaths. Among these targets, achieving zero new infections of HIV are thought to be the fastest means of realising the vision zero target (UNAIDS, 2011). Importantly, prior research revealed that an effective way to reduce new infections of HIV was to control the incidence of STDs such as syphilis, gonorrhoea, and chlamydia (Fleming & Wasserheit, 1999; Galvin & Cohen, 2004; Grosskurth et al., 1995; Mayaud & Mabey, 2004; Korenromp et al., 2005).

Second, two of the UNESCO's education for all (EFA) goals are (a) to achieve gender parity in lower secondary education by 2015 (EFA Goal 5) and (b) to enrol and retain many adolescents in lower secondary education until they complete school (EFA Goal 3). These efforts to close the gender disparity gap in high school education and to create equal opportunities for male and female

adolescents to realise their potential are synonymous with the millennium development goal (MDG) three. One year away from 2015, UNESCO (2014) reported that only 38% of gender parity had been achieved in lower secondary school and only 37% of adolescents in low income countries had completed school. Other literature shows adolescent pregnancy and subsequent childbearing have been the major contributory factors to this social problem. New infections of HIV among young people, together with a host of other social-cultural factors leading to school dropout, have also been implicated. To provide a glimmer of hope, the UNESCO's (2014) report estimated that, should adolescents, especially those in low income countries such as Ghana, be retained in school until completion and not quit prematurely as a result of in-school pregnancy and other related problems, about 171 million people would lift themselves out of poverty, giving rise to a 12% reduction in world poverty. In accordance with the vision zero policy, the Ghana Aids Commission has drawn a national strategic planreduce new heterosexual transmission of HIV by 50% by 2015 (Ghana Aids Commission, 2012).

Third, recent reports suggest that limited MDG successes have been achieved over the past decade. The achievement of MDG 3a (i.e., promoting gender parity in high school) and MDG 6 (i.e., combating HIV, malaria and other diseases) was reported to be failing, with less than one year to the 2015 deadline (United Nations, 2013a, 2013b). Thus, in the run-up to 2015 and post-2015, strategies to reduce young people's sexual risk behaviour would warrant clear, specific, well-defined, and robust practical and conceptual approaches. Therefore, heading to 2015 and post-2015, unintended pregnancy, STD, and HIV prevention and intervention research among young people requires renewed commitment and targeted action. For example, HIV and STD risk reduction strategies may include, but are not limited to, sexual abstinence, mutual monogamy, and sexual intercourse protected by condom use. Evidence shows that very few sexually active young people abstain from sex (Ariely & Loewenstein, 2006; Buhi & Goodson, 2007; Wadsworth & Wellings, 1994). Other research has

revealed that adolescents who pledge to become sexually abstinent are often unable to keep their pledges (Bearman & Bruckner, 2004; Kohler, Manhart, & Lafferty, 2008). In addition, there is some evidence that efforts to question potential sexual partners about their sexual history regarding HIV and STD before entering into a sexual relationship with them do not appear effective because people misrepresent the truth or may even be unaware of their HIV/STD status (Noar, Zimmerman, & Atwood, 2004).

Fourth, HIV/STD-risk prevention is a necessity for young people particularly because young people serve as the vectors through which new infections and diseases spread to the broader population (Jemmott & Jemmott, 2000). These prevention efforts become more crucial during the adolescent stage of development because it is a stage characterised by sexual experimentation and risk-taking. There is some evidence that many young people who acquire HIV or STD at the adolescent stage remain unaware of their serostatus for long periods of time. Previous research has shown that the detection and treatment of HIV and STDs pose huge economic cost to society (Baral & Phaswana-Mafuya, 2012; Chesson, Blandford, Gift, Tao, & Irwin, 2000; Lachaud, 2007; Piot, Bartos, Ghys, Walker, & Schwartlander, 2001; Piot, Bartos, Larson, Zewdie, & Mane, 2008). HIV/AIDS is also known to rob families of breadwinners and to deplete a family's savings. Again, HIV/AIDS is reported to affect the manpower needs of society, resulting from long term morbidity (Fox et al., 2004). Societies with emerging economies (like Ghana) suffer more from this comorbidity problem (Arndt & Lewis, 2000; Beckerman, LCSW DSW, & Auerbach, 2010; Booysen, 2002; Israelski et al., 2007). As noted in earlier sections of this dissertation, two of the most effective methods reported to enhance HIV, STD, and unintended pregnancy risk preventive behaviour are consistent condom use and delaying the sexual debut of young people (Taylor et al., 2007; Thompson, Kyle, Swan, Thomas, & Vrungos, 2002; Valadez et al., 2014; see also Flowers, Sheeran, Beail, & Smith, 1997; Sheeran, Abraham, & Orbell, 1999, for reviews).

In addition, other investigators have indicated that consistent condom use with sexual partners remains a cost-effective means of reducing sexual HIV and pregnancy risks among young people who are sexually experienced (Johnson, Carey, Marsh, Levin, & Scott-Sheldon, 2003; Noar, Morokoff, & Harlow, 2002). Despite the known effectiveness of condoms in simultaneously preventing unintended pregnancy, HIV, and STDs, only a few sexually experienced young people in Ghana use condoms (Ghana Aids Commission, 2010; Ghana Statistical Service/Ghana Health Service, 2009). It is well known that young women often suffer disproportionately from the consequences of sexual relations. Many such young women in Ghanaian high schools have had to withdraw from school as a result of pregnancy (Asante, 2012; *Daily Graphic*, 2011; Essel, 2011).

Fifth, many young people engage in sexual activity while enrolled in school. There is some evidence that school settings remain crucial to the sexual health development of young people. Often, it is at the school setting that most young people begin sexual experimentation. Extant literature shows schools are the one important place the great majority of young people go to before they enter the world of work (Kirby, 2002). Some researchers have described the processes by which young people acquire knowledge and values related to sexual intercourse as sexual socialisation (Ward, 2003). Previous work indicated that in-school youths who perceived their academic performance to be poor tended to have low self-esteem and lower educational aims, facilitating their engagement in early sexual activity (Ong, Wong, Lee, Holroyd, & Huang, 2013). Recent reviews and other empirical research provide evidence suggesting that a large number of young people of today are far more sexually active than previously thought (Chandra-Mouli et al., 2014; Cleland, Boerma, Carael, & Weir, 2004; Nair, 2004; Uecker, Angotti, & Regnerus, 2008; Woody, Russel, D'Souza, & Woody, 2000). For example, Chandra-Mouli et al. (2014) noted that young people's quest for sexual activity heightened their risk of adverse sexual health outcomes. Based on their findings, Chandra-Mouli et al.

(2014) argued that all sexually active young people, both unmarried and married, required contraceptive use education and sustainable contraceptive services within and beyond school settings.

Related to this, Uecker, Angotti, and Regnerus (2008) revealed that many adolescents of today are consistently indulging in what the authors called "technical virginity" — that is engaging in non-vaginal sexual activity such as oral sex in place of vaginal sexual intercourse, in order to claim that one is still a virgin. The authors observed that the practice of technical virginity was particularly becoming pervasive among young virgins because many young people seemed to be aware of the consequences of unintended pregnancy and of sexually transmitted diseases. The findings by Uecker et al. (2008) re-echoe similar results reported in an earlier research (Woody et al., 2000). Furthermore, Oliveira-Campos, Giatti, Malta, and Barreto (2013) studied the association between school and family contextual factors and young people's sexual behaviour, using data from 60,973 adolescents who participated in a national school health survey in Brazil. Oliveira-Campos et al. (2013) reported, among other findings, that school settings were associated with sexual risk-taking among young people. In a related study, Nair et al. (2012) assessed reproductive sexual health knowledge of 1,586 in-school adolescents in Kerala, India using a longitudinal study design. Pre-intervention results indicated that the majority of students had poor information about reproductive sexual health matters such as contraceptive use.

Clearly, schools offer important opportunities for sexual risk behaviour research with young people. High schools, for example, provide important avenues for young people to make sexual decisions. These decisions can be responsible or irresponsible, depending on the young person's personal characteristics and contextual factors in the school environment (Kinsman, Romer, Furstenberg, & Schwarz, 1998). As with other reported studies, these findings raise the question of the role sexual behaviour plays in the academic pursuit of young people. They also highlight the importance of sexual health interventions in school environments. Whereas, school environments are

central to young people's sexual debut, they can play a major role in reducing early sexual debut (Kirby, 2002a; 2002b). Therefore, there appears to be conceptual and practical importance of making in-school youths the target of sexual behaviour research. This consideration explains the rationale for choosing high school adolescents as the population group of interest in the current study.

Sixth, young people aged 10-24 years have become the largest global population group in history. With a total population of 1.8 billion, young people are reported to constitute more than a quarter of the world's population (Sawyer et al., 2012; WHO, 2009). They therefore have important roles to play in advancing the social and economic development of their respective societies (United Nations, 2013b; 2013c), given that cell phones, tablets, and social media have connected them to one another globally as never before (Dake, Price, Maziarz, & Ward, 2012; Drouin, Vogel, Surbey, & Stills, 2013).

Theory-guided sexual behaviour research. Theory-driven studies are central to evidence-based research and intervention (Green, 2000; Michie et al., 2005; Michie & Johnston, 2012). Health behaviour theory-based studies among young people can generally lead to a much clearer conceptual picture of the patterns of their risk behaviour. Health behaviour theory can help to identify key individual and social factors that may be amenable to change. This theory-based research may also focus on the age groups with high incidence of STD/HIV and unintended pregnancy and in settings with the greatest burden of these risks. Compared with non-theory-guided research and interventions, theory-guided health-enhancing behaviour-change research and interventions are reported to have superior explanatory power (Glanz & Bishop, 2010; Painter, Borba, Hynes, Mays, & Glanz, 2008). Recent systematic reviews reported in the *Cochrane Database of Systematic Reviews* revealed that sexual behaviour research and interventions guided by socio-cognitive theory and models were particularly robust when used to inform condom use interventions for young people and contraception use programmes in general (Lopez et al., 2013; Lopez, Tolley, Grimes, Chen, & Stockton, 2013).

Moreover, research indicated that health behaviour theory could lead to the formation of sound assumptions and achievable goals in sexual behaviour research and intervention (Kok, Schaalma, Ruiter, van Empelen, & Brug, 2004). Again, theory-guided research is thought to have a universal outlook because most health behaviour theories suggest research questions or hypotheses. Because of the many preventive public health opportunities theory-driven research offers, the use of theoretical models to guide youth sexual behaviour investigations in Ghana seems to be a research goal whose time has come (Francis, O'Connor, & Curran, 2012; Weinstein & Rothman, 2005). This investigation is needed to guide the design of youth HIV/STD-risk reduction programmes. To be informative, theory-based investigations should seek to identify the key psychosocial drivers for youth sexual risk behaviour (Fishbein, 2000; Fishbein & Yzer, 2003; Fisher & Fisher, 2000; Fisher, Fisher, Misovich, Kimble, & Malloy, 1996; Hightow et al., 2005; Jemmott III et al., 2007).

Nevertheless, to date there are no known Ghanaian theory-based models advanced to adequately account for HIV, STD, and pregnancy risk reduction among young people in the country. Health researchers have noted that an important imperative in evidence-based sexual behaviour research is to utilise a theory that reflects the characteristics of the population and dimensions of the particular behaviour under investigation (Eaton, Flisher, & Aarø, 2003; Jemmott & Jones, 1993). Furthermore, such a theoretical model must be a logically consistent psychological theory that has demonstrated sufficient validity through rigorous empirical tests across varying population groups and in different contexts. Again, this theory ought to have a parsimonious framework and well-defined components. Such a robust theoretical framework should be applicable to both men and women. Added to this, such a theoretical framework must suggest research questions or indicate hypotheses to help focus research on key variables of interest to researchers. Its constructs must also be amenable to change so as to facilitate the design of interventions. Finally, such a health behaviour theory should appeal to all age

groups. Arguably, the most cited health behaviour theory in history (Ajzen, 2011; 2014) that satisfies these requirements is Ajzen's (1991) classic theory of planned behaviour (TPB).

Brief introduction of the theory of planned behaviour. The theory of planned behaviour is a very popular social cognition theoretical model of health behaviour that has received considerable research support across different situations and among different populations. The TPB is a simple theoretical model with five well-defined components or constructs. It is often used to predict human social behaviour with a particular focus on health behaviour such as sexual health. Simply put, the TPB holds that behavioural intention is the immediate proximal predictor of a specified behaviour and that people's attitudes, subjective norms, and perceived behavioural control will indirectly predict their behaviour via the mediation of behavioural intentions. The intention-behaviour relationship, as postulated by the TPB, has been well supported in meta-analyses (Armitage & Conner, 2001; Webb & Sheeran, 2006). For example, the TPB's predictive utility in accounting for young people's sexual behaviour has been demonstrated empirically in the Western world and some countries in sub-Saharan Africa (see Fekadu & Kraft, 2001; Giles, Liddell & Bydawell, 2005; Jemmott et al., 2007; Lugoe & Rise, 1999; Molla, Nordrehaug Åstrøm, & Brehane, 2007; Schaalma et al., 2009).

Despite the overwhelming empirical support for the applicability of the theory of planned behaviour in predicting correlates of heterosexual condom use intentions and behaviour (Albarracin, Johnson, Fishbein, & Muellerleile, 2001; Armitage & Conner, 2001; Schaalma et al., 2009), the TPB has not yet been applied to explicate young people's sexual-risk preventive behaviour in Ghana. The application of the TPB framework to investigate youth sexual risk behaviour in Ghana may adequately shape our current understanding of the determinants of sexual risk-taking among young people. This thesis therefore reports on a study that examined the potential of using the TPB (Ajzen, 1991) to identify key variables reported to be associated with young people's sexual risk behaviour in a sample of senior high school students in eastern Ghana.

Research Hypotheses

The longitudinal theory of planned behaviour (TPB) model hypothesised below (see Figure 2) is guided by previous work on sexual-risk preventive behaviour, as reviewed in later sections of this dissertation (see theoretical framework Chapter). Indeed, the hypothesised relations between the TPB components over time in this study assume that causality flows from attitudes, subjective norms, and perceived behavioural control to condom use behaviour, via intention to use condoms. Several researchers, working independently, have found supporting evidence for the postulated relations of the TPB components as regards the prediction of intentions to use condoms and condom use behaviour in both meta-analyses and systematic reviews (Ajzen, 2002a; Albarracin et al., 2001; Albarracin, Kumkale, & Johnson, 2004; Armitage & Conner, 2000; 2001; Conner & Armitage, 1998; Hagger, Chatzisarantis, & Biddle, 2002; Hardeman et al., 2002; Rivis & Sheeren, 2003; Sheeran, 2002; Sheeran & Taylor, 1999; Webb & Sheeran, 2006).

Consequently, on the basis of the results of these meta-analyses and systematic reviews showing support for the predictive validity of the components of the TPB, it appeared plausible to investigate four hypotheses in the current study. First, it was hypothesised that attitudes towards condom use, subjective norms regarding condom use, and perceived behavioural control regarding condom use at Time 1 would be significantly positively associated with increased intentions to use condoms at Time 2, even after controlling for the autoregressive effects of the intentions to use condoms at Time 1 (H_1). Second, it was hypothesised that intentions to use condoms at Time 2 would be significantly positively associated with increased condom use behaviour at Time 3, even after controlling for the autoregressive effects of condom use behaviour at Time 1 and Time 2 (H_2). Third, it was hypothesised that intentions to use condoms at Time 2 would significantly, and fully, mediate the relationship between attitudes, subjective norms, and perceived behavioural control at Time 1 and condom use behaviour at Time 3 (H_3). Finally, it was hypothesised that a significant gender difference would be

found in condom use relative to the TPB components (H_4). The first three of these hypothesised relationships are depicted in Figure 2.

Various authors have used the TPB framework to provide important descriptions of how psychosocial factors influence intentions to use condoms during heterosexual sexual encounters (Carmack & Lewis-Moss, 2009; Giles, Liddell, & Bydawell, 2005; Jemmott et al., 2007; Schaalma et al., 2009). The empirical limitation of this prior research is that previous researchers have not carried out full longitudinal mediation analyses of the social-cognitive constructs implied by the TPB, leading to potentially biased research conclusions. For the most part, this is because cross-sectional data were used to estimate longitudinal mediation effects (Cole & Maxwell, 2003; Selig & Preacher, 2009). Longitudinal study designs, simply described as studies in which individuals (study participants) are observed at two or more measurement occasions, are needed in studies of correlates of safe sex such as condom-protected sexual behaviour (Schroder, Carey, & Vanable, 2003; Sheeran & Abraham, 1994). Longitudinal study designs enable researchers to account for within-subject covariates and stationarity. Stationarity describes the extent to which one group of variables produces changes in another group of variables, and the degree to which that group of predictors (the former) remains stable over time (Kenny, 1979).

Linked to most longitudinal study designs are mediation models. Mediation models are prerequisites for health risk reduction researchers because they help to explicate the intervening processes through which the effects of prevention and intervention strategies are brought to fruition for individual participants (Bryan, Schmiege, & Broaddus, 2007; Collins, MacKinnon, & Reeve, 2013; Mackinon & Luecken, 2008). For example, a health psychologist may be interested in knowing whether a condom skills training intervention for young men gives rise to increased condom use by influencing attitudes towards condom use and intended condom use.

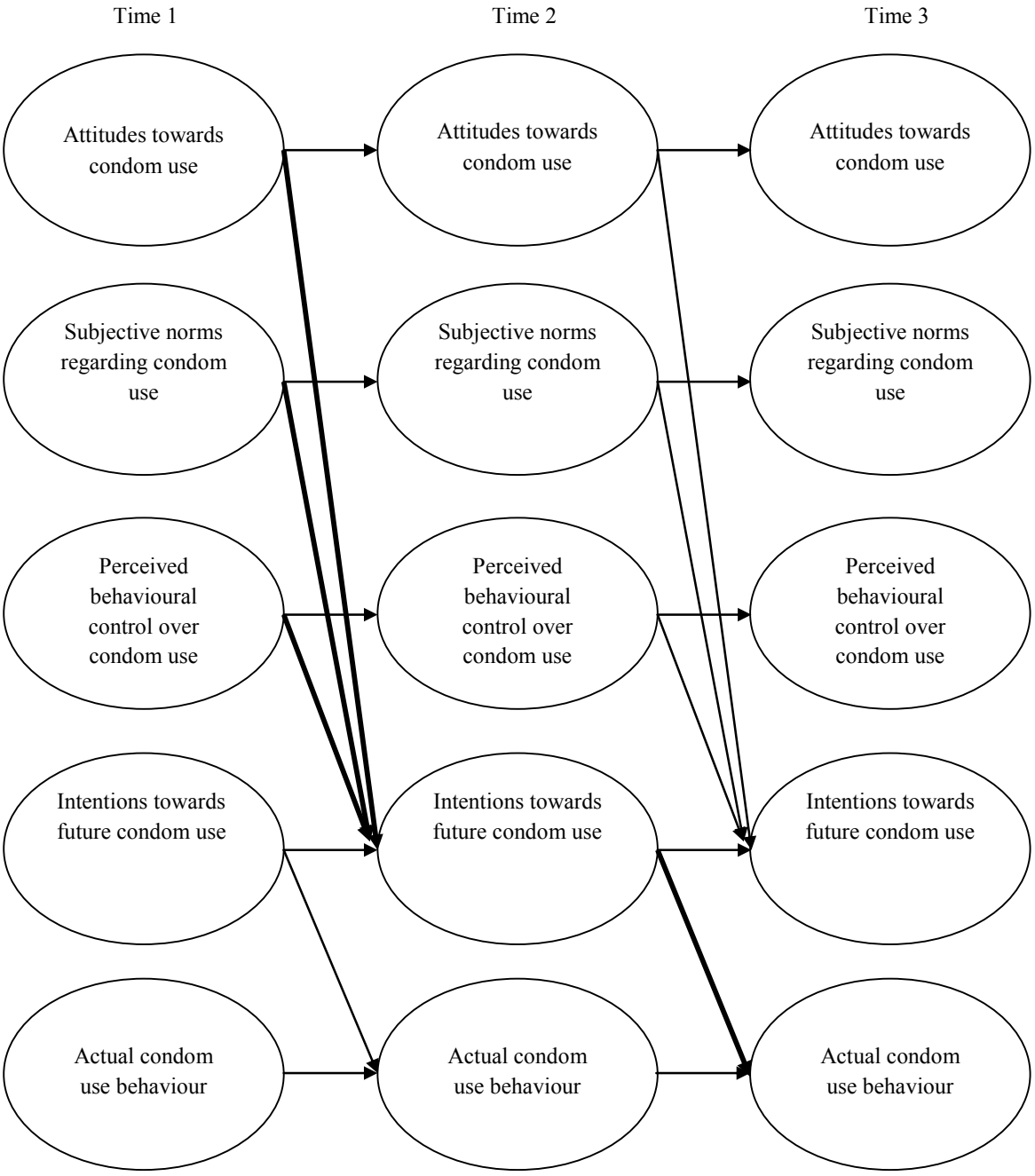

Figure 2. Hypothesised longitudinal model of the theory of planned behaviour's components. The 3 cross-lagged paths coming out of Time 1 attitudes, subjective norms, perceived behavioural control respectively depicted by the 3 boldfaced downwardly sloped lines to Time 2 intentions and the single cross-lagged path emanating out of Time 2 intentions depicted by the single boldfaced downwardly sloped line to Time 3 behaviour represent the primary hypotheses of this study. For ease of reading, indicators, error terms, and disturbance terms are not shown.

In this example, attitudes towards condom use and intention to use condom would be considered potential mediators of the relationship between the condom skills training intervention and young men's self-reported condom use. In sum, this research employs a latent variable structural equation modelling (SEM) technique to assess the extent to which the TPB framework provides a good fit for condom-protected sexual behaviour data in a sample of heterosexual young people in eastern Ghana over time.

Structure of the Thesis

This thesis is organised into six chapters. Chapter I provides a general introduction to the study. Chapter II evaluates the sexual behaviour literature and provides a synthesis of the prior research in the area in order to contextualise the present study. Chapter III presents the theory of planned behaviour (TPB) and highlights the role of health behaviour theory as well as the role of sound methodological practices in sexual behaviour research. Chapter IV describes the methodological procedures and ethical considerations of this study. Chapter V presents the results by outlining the data analyses steps as well as the statistical techniques used. Chapter VI interprets the results and discusses them in relation to the stated hypotheses and to the extant literature. The literature review chapter (i.e., Chapter II) is presented next.

Chapter II

LITERATURE REVIEW

Introduction to this Chapter

In this chapter I review the sexual behaviour literature relative to young people; and then I synthesise the key findings in accordance with the goals of the current research. To achieve this objective, I organise the synthesis into key thematic areas; and, where necessary, I provide sub-themes to facilitate reading. These thematic areas include young people and sexual risk behaviour, young people and HIV, young people and STDs, and young people and pregnancy. Next, I offer a discussion on condom promotion and use, and then I identify some obstacles associated with condom use. Finally, I end the chapter by presenting differences in condom use by gender.

Young People and Sexual Risk Behaviour

Youth sexual behaviour is generally associated with risks and health problems. Sexual behaviour patterns of young people of this generation are known to be increasingly changing for the worse (Ompad et al., 2006). The number of young people engaging in sexual-risk taking is on the increase (Manzini, 2001; Salih, Metaferia, Reda, & Biadgilign, 2014). Conversely, the age of sexual debut among these young people is on the decrease (Cavazos-Rehg et al., 2009; Crochard, Luyts, di Nicola, & Gonçalves, 2009; Zhao et al., 2012). Early sexual debut renders young people vulnerable to sexual health threats (Epstein et al., 2014; Zimmer-Gembeck, & Helfand, 2008). The growing consistency of sexual health-compromising behaviour of young people has made them a population group at risk of HIV, STDs, and unintended pregnancy.

Ghana's young people and sexual risk behaviour. Approximately, one in three Ghanaians is a young person aged 10-24 years (Ghana Statistical Service [Census 2010], 2013). Evidence shows that four in 10 young Ghanaian women aged 15-19 years, and two in 10 young men in the same age group, have had sexual intercourse. Of those who have had sexual intercourse, four in 10 young women, and six in 10 young men, aged 12-24 years reported having engaged in multiple sexual relationships (Guttmacher Institute, 2004). In a related study, Odonkor et al. (2012) studied STD infection trends and their relationship with sexual risk behaviour in a sample of 250 young people aged 15-25 years, attending public senior high schools in Accra, Ghana. The authors found that 49.2% of the study participants reported having commenced sexual debut between ages 13 and 18 years. Odonkor et al. also observed that 42.1% reported having had multiple sexual partners and 78.6% of them knew they would contract STDs if they had unprotected sexual intercourse with an infected partner.

Relatedly, a household-based nationally representative survey in Ghana investigated sexual and reproductive knowledge among 12 to 19 year-olds. The survey results showed that only 37% of young women aged 12-14 years and 60% of those aged 15-19 years knew that a young woman could become pregnant on her very first sexual encounter (Awusabo-Asare, Biddlecom, Kumi-Kyereme, & Patterson, 2006). Awusabo-Asare et al. (2006) revealed that 79% of young women and 67% of young men were sexually experienced, with 13% of young women aged 15-19 years getting pregnant and a further 14% in the same age group giving birth before reaching 15 years of age (Awusabo-Asare et al., 2006). Again, Awusabo-Asare and colleagues observed that knowledge of contraceptives was high among young people (90%). Nonetheless, 48% of young women and 60% of young men reported that they would be embarrassed to buy a condom from a pharmacy. Whereas, about 50% of young women indicated that they could not ask their sex partners to use condoms, about 58% of young men said they were not sure they could use a condom effectively (Awusabo-Asare et al., 2006). Awusabo-Asare et al. also found that, compared with family members such as parents, young people were more likely to

discuss sexual problems with non-family members such as friends. Based on these results, the authors advocated sustainable sex education among in-school youths in Ghana.

Similarly, Sallar (2008) conducted a quantitative and qualitative study (mixed-method) among 483 young people aged 10-19 years in the Ashanti region of Ghana to assess their sexual behaviour and condom use trends. The author revealed that, compared with out-of-school youths, school-going youths commenced sexual debut earlier. Other results showed that school-going youths were more likely not to use condoms than were out-of-school youths. Given this finding, Sallar (2008) called for sexual health programmes that help increase condom use among young people in Ghana. Added to this, Glover et al. (2003) examined the sexual health experiences of 704 never-married young people aged 12-24 years in Ghana. Of the 704 participants, they found that 52% had previously engaged in sexual activity, with more young women than young men reporting sexual intercourse experiences. Whereas 99% of the participants indicated that they knew about condom use, Glover et al. (2003) found that only 48% of those who knew about condom use were able to identify four simple, correct ways of using condoms. Other results revealed that young women were the least informed about condom use. Moreover, Glover et al. (2003) observed that two-thirds of participants expressed their displeasure with young men purchasing and carrying condoms, whereas three-quarters indicated that young women should not be allowed to purchase and carry condoms.

Furthermore, a trend analysis of the 2003 and 2008 demographic and health survey (DHS) data in Ghana was carried out by Abdul-Rahman et al. (2011) to examine the rate of contraceptive use among 360 married and unmarried young women aged 15-19 years. Their analysis revealed that the contraceptive prevalence rate rose from 23.7% in 2003 to 35.1% in 2008. However, they observed that increasing numbers of young women were shunning modern contraceptives (e.g., condoms) in favour of traditional methods such as “periodic” abstinence. For example, results of the trend analysis showed that condom use rate declined substantially from 63.3% in 2003 to 38.6% in 2008. Abdul-Rahman et al.

(2011) noted that condom non-availability, the high cost of condoms as well as myths and hedonism accounted for the declining interest in using modern contraceptives among young people. From this research, it appears crucial to explore what psychosocial factors determine the intentions to use condoms among young people and whether such intentions translate into actual condom-use behaviour over time.

In another assessment of contextual and behavioural factors and their effect on youth sexual risk behaviour in Ghana among a nationally representative sample of 3,739 unmarried youths aged 12-24 years, Karim, Magnani, Morgan, and Bond (2003) showed that more than 40% of young women and 36% of young men reported being sexually experienced. Nevertheless, only 24% of young men and 20% of young women indicated that they had used condoms at their last sexual intercourse. The study also revealed that within-person behavioural factors such as condom use self-efficacy beliefs predicted condom use more strongly than did contextual factors such as socioeconomic status, sexual communication with one's parents, and community living arrangement. In interpreting their findings, Karim et al. (2003) called for targeted sex education programmes to address the unfavourable sexual negotiation and communication outcomes among in-school youths.

Using a qualitative behavioural survey methodology, Tagoe and Aggor (2009) assessed attitudes and behaviour towards HIV infection risk among 375 university students in Ghana. The study revealed that many students consistently engaged in pre-marital sexual activity and that they rarely used condoms. Also, students did not use condoms at all in sexual relationships they considered to be steady due to issues of trust. Other findings indicated that, though the majority of participants felt they were susceptible to the risk of HIV and STDs, they were not willing to know their HIV status because of the fear of negative outcomes, prompting Tagoe and Aggor (2009) to advocate condom education and use among students in Ghana.

Moreover, recent research on sexual harassment among 522 young women in public senior high schools in Ghana, undertaken by Agyepong, Opare, Owusu-Banahene, and Yarquah (2011), found that sexual harassment of in-school adolescents was more widespread than previously thought. Of the 522 female students sampled, 78% perceived the situation to be serious. Whereas 10.5% of the participants considered sexual harassment in their school as a big problem, 11.1% interpreted the problem as part of school life in public high schools in Ghana. On the basis of this finding, Agyepong and colleagues (2011) called for sexual assertiveness training for adolescent women to help address this health problem. Other related previous research in Ghana reported that more than two-thirds of the adolescent women aged 10-14 years who took part in a sexual behaviour survey reported that they were worried about acquiring HIV (Fiscian, Obeng, Goldstein, Shea, & Turner, 2009).

Taken together, these findings regarding young people's sexual behaviour in Ghana seem to highlight the need for participatory action sexual behaviour research, with young people as important subjects. This research may help to identify the psychosocial determinants (i.e., attitudinal and normative influences) of young people's sexual risk behaviour to inform the design of sexual risk reduction interventions. Such a research undertaking is consistent with the WHO's directive to reduce new HIV infections among youths, as the epidemic is widely thought to be driven by young people (Monasch & Mahy, 2006).

Global youth sexual behaviour trends. Recent global reports and other empirical research indicated that a growing number of young people below 15 years of age worldwide were engaging in sexual activity (Crepaz & Marks, 2002; Gabhainn, Baban, Boyce, & Godeau, 2009; Godeau et al., 2008; Halpern, Waller, Spriggs, & Hallfors, 2006; Kotchick, Shaffer, Forehand, & Miller, 2001; Sonenstein, 2008). About 19% of these sexually experienced young women aged 15 years and below, living in developing countries, were reportedly becoming pregnant before reaching 18 years of age (UNFPA, 2013a; 2013b). Correspondingly, many young men were reported to be engaging in multiple

sexual relationships (UNAIDS, 2010). From these global reports, it seems clear that young people worldwide have become a population group at risk of HIV and other sexually transmitted diseases.

In sub-Saharan Africa, research has long indicated the occurrence of high prevalence of sexual activity among 15-19 year-olds. For example, data show that many young sub-Saharan Africans become sexually experienced before reaching 20 years of age (Corcoran, 2002; Matasha et al., 1998; Todd et al., 2004; Varga, 2001). Among this youthful population, initial sexual intercourse and low age at sexual debut were reported to influence future sexual relationships, serving as indicators of sexual risk behaviours (Monasch & Mahy, 2006; Mpofu, Flisher, Bility, Onya, & Lombard, 2006). For example, in a cross-sectional survey of sexual behaviour among 474 Grade eight adolescents aged 12-15 years recruited from schools in Cape Town, South Africa, Gevers, Mathews, Cupp, Russell, and Jewkes (2013) reported that low risk sexual behaviour was highly prevalent among students. Approximately 71% of adolescent women and 88% of adolescent men were found to have engaged in kissing. About 3.9% of adolescent women and 13.8% of adolescent men participated in oral sex, with 9.3% of adolescent women and 30.0% of adolescent men engaging in vaginal sex. Additionally, 1.4% of adolescent women and 10.5% of adolescent men reported participating in anal sex. Gevers et al. (2013) also revealed that increasing numbers of dating young men and women were also engaging in other health-risk behaviours such as non-use of condoms and substance use.

Previous research has shown that early sexual debut combines with other structural challenges, such as lack of access to accurate sexual health information, low socioeconomic status, and condom inaccessibility, to heighten young people's vulnerability to HIV/STD risks (Crepaz & Marks, 2002; Kotchick et al., 2001; Nyanzi, Pool, & Kinsman, 2001; Stroeken et al., 2012). Furthermore, other investigations indicated that unsafe sexual activity was the second major risk factor for disability and death in the poorest communities worldwide (Glasier, Gülmezoglu, Schmid, Moreno, & van Look, 2006). Related to this sexual health problem, young people worldwide represent 43% of the world's

estimated 7 billion people, with approximately 1.2 billion aged 10-19 years (UNFPA, 2011b). The report of the UNFPA (2011b) also revealed that about 60% of young people worldwide reside in the developing world. Given young people's large population and the fact that they mostly drive the HIV epidemic and other STDs as a result of sexual-risk taking, it appears clear that young people may benefit from sexual risk reduction behavioural research and intervention. This research requires population-and setting-specific approaches in order to identify both risk and protective factors that serve to exacerbate or reduce youth sexual risk behaviour. Extant literature shows that behavioural sexual health interventions give rise to enduring health-enhancing behaviour change (Campbell, 2003; Kirby et al., 2004; Kirby, Laris, & Rolleri, 2007; Kirby, Obasi, & Laris, 2006; Robin et al., 2004).

Young People and HIV/AIDS

Young people are increasingly affected by HIV/AIDS. Worldwide, an estimated 5.4 million young people were living with HIV in 2012, compared to the 3.4 million that were living with the virus in 2011 (UNAIDS, 2012; 2013). Of the 5.4 million young people living with HIV in 2012, 900 000 were adolescents aged 10-14 years. Young people aged 15-24 years accounted for 39% of the total 2.3 million new HIV cases recorded in 2012 (UNAIDS, 2013). HIV poses major problems for human survival and health (Gallo & Montagnier, 2002).

Ghana's young people and HIV. Ghana has a generalised HIV epidemic status. Recent reports in Ghana showed an HIV prevalence rate of 1.9% among young people aged 15-19 years in 2011, compared with a prevalence rate of 1.1% among this population group in 2010 (Ghana Aids Commission, 2012). After people aged 30-34 years (2.9% prevalence rate), young people aged 15-19 years in Ghana were the population group most affected by HIV in 2011 (Ghana Aids Commission, 2012). From these national demographic and health surveys, it seems obvious that HIV/AIDS constitutes a significant burden of disease in Ghana. Previous research revealed that heterosexual

sexual contact accounted for 70-80% of the rapid spread of the HIV virus in Ghana (Adih & Alexander, 1999; Bosu et al., 2009). Other surveys indicated that low-risk heterosexual intercourse accounted for 30.2% among people aged 15-49 years in 2008 and was the highest contributor to the national HIV prevalence rate (Ghana Aids Commission, 2010; Ghana Statistical Service/Ghana Health Service, 2009). As with other countries, halting and reversing the spread of HIV in Ghana is a key national goal. Although HIV prevalence is reported to be stabilising in some parts of Ghana and among some population groups, there exist geographic variations of the epidemic by age, gender, and by setting.

The scope of youth HIV. About 40% of all global HIV infections are diagnosed among young people aged 15-24 years (UNICEF, 2011a). Among youths aged 15-19 years and those aged 10-14 years, AIDS is estimated to be the eighth and sixth leading cause of death respectively (UNICEF, 2011b). Sub-Saharan Africa is disproportionately impacted by HIV, accounting for 70% of all new cases of HIV in 2012. Approximately, 2.1 million adolescents aged 10-19 years in developing countries were living with HIV in 2012 (UNAIDS, 2013; UNICEF, 2011a; 2011b). Compared with other population groups, young women experience higher HIV incidence. Evidence shows that about 45% of young women worldwide have endured forced sexual contact during their first sexual encounters (UNAIDS, 2012). Whereas many young women were reported to be dying from their HIV infections, others were reported to be unaware of their HIV status. These findings create a sense of urgency to halt and to reverse new infections of HIV among young people (UNICEF, 2011b).

HIV infection among young people is thought to stem primarily from sexual intercourse with an infected sex partner, although it is reported that perinatally-acquired HIV among young people is on the rise (D'Angelo, Samples, Rogers, Peralta, & Friedman, 2006; Gray, 2009). It is well known that scaling up the prevention of sexual HIV transmission among young people is central to the fight against the spread of the virus (UNFPA, 2012). It is for this reason that the millennium development goal 6 (MDG) was adopted by the United Nations' member countries to halve sexual HIV transmission by

2015. However, as the world approaches the 2015 deadline, the United Nations (2013b) reported that many countries were not on track to reducing sexual HIV transmission by 50% despite the gains made in other aspects of the HIV response.

Young People and STDs

Sexually transmitted diseases (STDs) disproportionately affect young people worldwide (Chambers & Rew, 2003; Green et al., 2012; van der Bij, Stolte, Coutinho, & Dukers, 2005; Risser et al., 2005). STDs such as syphilis, chlamydia, gonorrhoea, and trichomoniasis have long been implicated in HIV transmissions (Fleming & Wasserheit, 1999; UNAIDS, 2011; Wilkinson et al., 2012). For example, in the United States, the Centres for Disease Control and Prevention (2013a) estimated that of the 20 million new cases of STDs diagnosed annually, half of them occurred among young people.

Ghana's young people and STDs. As with the United States and other countries, the incidence of STD is reported to be high among young people in Ghana. For example, of 383 female adolescents who self-reported ever having sexual intercourse in the 2008 Ghana demographic and health survey (DHS), 29.1% reported STD infections and 27.2% reported symptoms of STD infections such as genital discharge (Ghana Statistical Service/Ghana Health Service, 2009). In the same survey 200 male adolescents self-reported ever having sexual intercourse, of which 7.4% and 6.6% reported STD infections and symptoms of STD respectively.

Similarly, Ohene and Akoto (2008) carried out a secondary data analysis of the 2003 Ghana demographic and health survey report among 1,280 young women who reported being sexually experienced. Ohene and Akoto (2008) found that 12% of the young women had STD infections and about 37% of those with STDs did not know where to obtain condoms. In concluding their findings, the authors called for condom promotion programmes to involve young women. Relatedly, Glover et al.

(2003) investigated sexual risk behaviour and STD infection among 704 never-married in-school and out-of-school youths aged 12-24 years in three Ghanaian towns. Their research revealed that 25% of young men and 8% of young women reported having been diagnosed of STDs at some point in their lives.

The scope of STD infection. Fleming and Wasserheit (1999) conducted a systematic review of the association between STDs and the spread of HIV and found a significant link between STD and HIV transmission. The authors suggested that early STD intervention should be made front-line in the context of HIV prevention efforts. Additionally, Mayaud and Mabey (2004) reported that 75-85% of the estimated 340 billion new cases of STDs diagnosed in the world annually emanated from developing countries. These STD infections, they noted, explained about 17% of the economic losses that occurred in developing countries as a result of ill-health. Mayaud and Mabey (2004) argued that the incidence of STDs was creating a health and economic burden in most developing countries, and called for the use of what they described as a "syndromic approach" to manage it. In the United States, the Centres for Disease Control and Prevention (2013b) estimated that the annual direct cost emanating from STD infections to the American healthcare system was about USD 16 billion in 2010.

Furthermore, in a seminal longitudinal study in Tanzania, Grosskurth and colleagues (1995) used a randomised control trial design to establish the effect of STDs on HIV infections. The authors compared six treatment communities and six control communities and assessed STD seroconversion (i.e., changing from STD positive condition) to HIV across time in a total sample of 12,437 adolescents and adults aged 15-55 years. Baseline HIV prevalence rates were 3.8% (treatment communities) and 4.4% (control communities). A total of 71% (8,845) of the sample were observed at follow-up two years later, of which 1.2% of seronegative participants (in the treatment communities, and 1.9% of seronegative participants in the control communities, seroconverted. These results led Grosskurth et al. (1995) to conclude that effective STD treatment would reduce the incidence of HIV by about 40%.

Other research has noted that STDs greatly influence HIV transmission because they cause ulcers and inflammations that become infectious with time (Galvin & Cohen, 2004). From this research, it seems clear that condom promotion and use among young people would help control not only sexually transmitted HIV but also STD infection.

In addition, Korenromp et al. (2005) reviewed the STD and HIV literature and reported that, because STDs act as co-factors in HIV transmission, improved STD interventions would reduce HIV prevalence rates in settings with high-risk sexual behaviour and high STD infection rates. Correspondingly, the Centres for Disease Control and Prevention (2013a) revealed that STD infections had the potential to threaten the life of a pregnant woman and that of her unborn baby. Again, these results underscore the importance of promoting condom use among young people in order to reduce their risk for STDs. The case for condom promotion and use during vaginal or anal sexual intercourse for protection against STDs is increasingly supported by laboratory and empirical epidemiological evidence (Bosarge, 2007; Macaluso et al., 2007; Motsoane, Bester, Pretorius, & Becker, 2003; Shoupe, 2006; Warner & Stone, 2007; Williams & Fortenberry, 2011).

Although the effects of STDs are detrimental to young people and adults, young people often tend to perceive the risk of their contracting STDs to be low (Sychareun, Thomsen, Chaleunvong, & Faxelid, 2013). From this research, it seems apparent that young people may benefit from condom use research and intervention. This research may target young people, especially at institutions such as high schools where perceptions of invulnerability to health threats are acquired and reinforced by peers. The important role condoms play in preventing and controlling STDs in relation to HIV has been well documented in empirical research (Galvao et al., 2005; Holmes, Levine, & Weaver, 2004; Padian, Buvé, Balkus, Serwadda, & Cates, 2008; WHO, 2007). For example, Sandøy, Zyaambo, Michelo, and Fylkesnes (2012) assessed the impact of condom distribution at venues where sexually active young people meet with the intention of establishing sexual relationships (“hook-ups”); and they evaluated the

impact one year later with a follow-up survey in the township. The authors compared their results to that of a control site where no condoms were distributed; and they supplemented their findings with qualitative data. Sandøy et al. (2012) concluded that the site with condom distribution recorded high rates of condom use as well as a substantial reduction in sexual risk behaviour.

Furthermore, Biddlecom, Munthali, Singh, and Woo (2007) investigated sexual practices among young people aged 12-19 years using nationally representative surveys from Ghana, Malawi, Uganda, and Burkina Faso, and reported that a very large proportion of sexually active young people did not know where to obtain condoms or where to receive STD treatment. Their results also showed that embarrassment and financial cost prevented many young people from seeking STD treatment. The authors, therefore, noted that the pattern of young people's sexual health attitudes and knowledge was largely similar from country to country. On the basis of the foregoing research findings, it is clear that efforts towards condom promotion and use as a strategy to control STD and HIV infections among young people will help reduce new cases of STDs and HIV (Bogale, Boer, & Seydel, 2010; de Wit, Aggleton, Myers, & Crewe, 2011; Maharaj & Cleland, 2006; Maticka-Tyndale & Tenkorang, 2010).

Young People and Pregnancy

Adolescent pregnancy is a social problem worldwide. Adolescent pregnancy is associated with adverse social, personal, educational, and medical outcomes for teen mothers, their infants, and society (Black, Fleming, & Rome, 2012; UNFPA, 2013a; 2013b). Youth pregnancy raises serious public health concerns and perpetuates the widening disparities in health and socioeconomic status (Kearney & Levine, 2012; Paranjothy, Broughton, Adappa, & Fone, 2009). Evidently, pregnant young people are a population group at risk (Cavazos-Rehg et al., 2012; Fleming et al., 2013; Mahavarkar, Madhu, & Mule, 2008). The United Nations Population Fund (UNFPA) re-echoes the magnitude of pregnancy involving young people by observing that "when a girl [young woman] becomes pregnant, her present

and future change radically, and rarely for the better. Her education may end, her job prospects evaporate, and her vulnerabilities to poverty, exclusion, and dependency multiply" (UNFPA, 2013b, p. ii).

Ghana's young people and pregnancy. Despite efforts to promote safe sex in Ghana, pregnancy among young people remains a public health problem (Ghana News Agency, 2010; 2014a; Keller, Hilton, & Twumasi-Ankrah, 1999). Promoting consistent condom use and delaying the onset of sexual activity among young people are effective adolescent pregnancy prevention strategies for sexually-experienced adolescent populations (Lavin & Cox, 2012). Teen motherhood in Ghana is associated with high infant and child mortality, emanating from pregnancy and delivery-related complications (Ghana Statistical Service/Ghana Health Service, 2009). Like elsewhere in the world, pregnancy among young people in Ghana brings about limited education and job opportunities. Reports indicate that many young Ghanaians have had to drop out of school because of pregnancy (Ghana News Agency, 2014b).

Morhe et al. (2012) investigated pregnancy cases among 481 randomly selected young people aged 15-19 years in a household-based cross-sectional survey in a district in Ghana. Results showed that 58% of the sexually experienced young women reported having been pregnant at some point in the past. Morhe et al. (2012) also reported that 37% of those who had previously been pregnant underwent induced abortion. The authors concluded that age at sexual debut, gender, and not being in school correlated highly with adolescent pregnancy, and thus advocated keeping adolescents in school to reduce the incidence of pregnancy among them. This finding is consistent with that reported by an earlier research among young people in Ghana (Keller, Hilton, & Twumasi-Ankrah, 1999). Correspondingly, the Ghana Coalition of NGOs in Health (GCNH) reported that an estimated 750,000 adolescents in Ghana become pregnant every year (Ghana News Agency, 2013). Recent research indicated that Ghanaian adolescents were initiating sexual activity at earlier ages (Darteh & Nnorom,

2012). As with early marriage that predicts number of pregnancy exposures of young people, early sexual debut is known to increase the frequency of young people's pregnancy risks.

The scope of youth pregnancy. Worldwide, nearly 16 million young people aged 15-19 years give birth annually. Adolescent deliveries constitute 11% of all births globally, with about 95% of adolescent births occurring in developing countries (WHO, 2012). In developing countries, pregnancy and delivery-related complications are the leading cause of death among young people aged 15-19 years. In addition, babies born to teen mothers have a 50% higher risk of perinatal deaths than do babies born to non-teen mothers (WHO, 2012). The majority of youth pregnancies are unintended, constituting the highest rate of unintended pregnancies, compared to other female age groups (Finer & Zolna, 2011; Mkhwanazi, 2010; Sales & DiClemente, 2010; Sedgh et al., 2006). Unintended pregnancies are associated with numerous health risks. For example, adolescent babies have higher risk of low birth weight and long-term disability than do babies born to adults (Finer & Zolna, 2011). Prior research has shown that in resource-limited countries, many young people with pregnancy suffer poor nutrition, jeopardising foetal growth and maternal health (King, 2003). To help reduce young people's risks of unintended pregnancy, the WHO (2012) prescribed adolescent pregnancy prevention measures to include condom education and condom use among adolescents at risk of pregnancy. In addition, the WHO (2012) advocated research and intervention to reduce forced sexual relations and early marriage among young people.

In Finland, Leppälahti, Gissler, Mentula, and Heikinheimo (2013) assessed obstetric outcomes of adolescent pregnancies involving 13-15 year-olds (n = 84), 16-17 year-olds (n = 1,234), 18-19 year-olds (n = 5,987) and compared the outcomes to those of adult women aged 25-29 years (n = 51,142). Leppälahti and colleagues (2013) reported that compared with adult women, teenage mothers experienced greater risks of obstetric complications such as anaemia, proteinuria, eclampsia, pyelonephritis, and urinary tract infections. These complications, they noted, led to preterm births. The

authors also found that the risk of obstetric complications increased as the age of teen mothers decreased. Similarly, Vieira et al. (2012) studied the association of maternal age range and the prevalence of adverse birth outcomes in a cross-sectional sample of young women aged 24 and below in Rio de Janeiro, Brazil. Vieira et al. (2012) observed that out of 40,111 live births recorded within the study period, 1.9% were delivered by teen mothers aged 10-14 years, 38% were delivered by teen mothers aged 15-19 years, and 59.9% were delivered by young women aged 20-24 years. Their study revealed a significant association between maternal age and adverse birth outcomes among adolescent mothers.

In Ghana, pregnant adolescents are exposed to the double burden of malaria and adverse obstetric outcomes. Orish et al. (2012) investigated the prevalence of malaria and aneamia among young people who were pregnant (n = 107; aged 19 years and younger) in four hospitals in western Ghana from January 2010 to October 2010, and compared the results with those of adult pregnant women (n = 759; aged 20 years and older). Results indicated that young pregnant women had a higher risk of malaria infection (34.6%) than did adult pregnant women (21.3%). The results also showed that young pregnant women had a greater risk of aneamia (43.9%) than did adult pregnant women (33.2%). Orish et al. (2012) concluded that young pregnant women in Ghana were more likely to suffer from malaria and aneamia than were adult pregnant women; and they called for youth-friendly health policies and programmes to reverse the prevalence of unintended pregnancy among young people. From the aforementioned research, it seems clear that young people remain vulnerable to many health problems. With pregnancy, the difficulties that young people face increase greatly. The effect of youth pregnancy on family and society is enormous. Pregnancy among young people is of important concern to society not only because of its association with poverty and perinatal mortality, but also because most of these pregnancies result from rape, incest, and violence. This situation raises many questions that deserve the attention of health psychologists and other public health professionals.

Young men and pregnancy outcomes. Young men have an important influence on adolescent pregnancy outcomes; and the decision to keep an unintended pregnancy to term or to terminate it may be largely influenced by young men. As the potential fathers-to-be, their decisions regarding the outcomes of unintended pregnancy have major consequences for the psychological functioning of the female partner (Lohan, Cruise, O'Halloran, Alderdice, & Hyde, 2010). Consequently, young men deserve equal attention in planning research and interventions to prevent youth pregnancy, because pregnancies result from a dyadic relationship (UNFPA, 2013a; WHO, 2012). Literature shows that there is a gender bias in favour of young women in planning pregnancy prevention in Ghana. For the most part, it is commonplace that adolescent men are responsible for adolescent women pregnancies. The consequences of youth pregnancy for both young men and young women are telling, although it is known that young women bear a disproportionate burden of the consequences. The argument for equal focus on sexual risk reduction for both adolescent men and women is a research goal whose time has come. In a systematic review of adolescent men's preferences for resolving adolescent pregnancy, Lohan, Cruise, O'Halloran, Alderdice, and Hyde (2010) drew similar conclusions by noting that the inclusion of young men in pregnancy prevention initiatives would be an effective strategy to scale up intervention responses.

In a related investigation, Lohan et al. (2011) explored in-school young men's decision-making regarding unintended pregnancy using a hypothetical video drama in a cross-sectional study of 360 young men aged 14-18 years in Ireland. Lohan et al. (2011) found that young men had more favourable attitudes towards carrying the pregnancy to term, compared with their attitudes towards termination of the pregnancy. Young men's preference for keeping the pregnancy was reported to be borne out of the perceived consequences of unsafe abortion. This finding appears to suggest that young men may not fully appreciate the consequences that teen pregnancy can bring to the mother and infant. Moreover, in a recent study on young men's priorities concerning a partner's pregnancy among 330 Australian in-

school male students, Corkindale et al. (2009) revealed that 80.6% of young men indicated that they would encourage their partner to end the pregnancy, 67.9% would like their partner to keep the pregnancy, and 34.6% said it was up to the partner to decide what to do with the pregnancy. Given these divergent viewpoints, Corkindale, Condon, Russel, and Quinlivan (2009) called for research to investigate the attitudes and beliefs of young men regarding partner pregnancy prevention in order to inform the design of targeted condom education. This education, the authors observed, might help prevent adverse psychological sequelae associated with unsafe abortion among most young women.

In Ghana, the role of young men in unintended pregnancy and its resolution is much the same. Schwandt et al. (2013) conducted a qualitative study on the role of male partners in unintended pregnancy resolution and abortion decision-making. The authors reported that young men often denied responsibility for pregnancy, and that they played a pivotal role in resolving pregnancy through induced abortion. Schwandt and colleagues (2013) argued that young men in Ghana deserved commensurate consideration in planning pregnancy research and prevention programmes because they give "orders" for unintended pregnancies to be terminated.

Youth pregnancy and school exclusion. School dropout is generally considered a social problem (Unterhalter, 2013). The impact of youth pregnancy on young people's educational attainments is substantial. Many young people in Ghana have high hopes of successfully completing high school in order to attend university and enjoy the rewards that come with such achievements. Unfortunately, not many of these young people achieve their life's goals because they quit school prematurely. Although the reasons why young people drop out of school in Ghana are varied, key among them are adolescent pregnancy and childbearing (Ananga, 2011). Relevant literature on the rate of adolescent school dropout following pregnancy in the Ghanaian context is limited. However, the mass media have consistently reported young people leaving and being excluded from school prematurely because of pregnancy (Ghana News Agency, 2010; 2014a; 2014b). Correspondingly,

previous work has reported that the known opportunities associated with education make most Ghanaian youth unhappy when circumstances force them to drop out of school (Ananga, 2011; Dunne & Ananga, 2013).

Other researchers have reported that young people's sexual activity negatively impacts young women's schooling (Clark & Mathur, 2012). For example, Basch (2011a) studied the pathways through which youth pregnancy and subsequent birth affect academic achievement among urban youth aged 15-17 year-old non-Hispanic Blacks, non-Hispanic Whites, and Hispancis. Basch (2011a) reported that, compared with adult mothers who delayed childbirth until age 30 years, young mothers' education was two years shorter. The study revealed that young mothers had 10-12% likelihood of not completing school and had 14-29% less likelihood of attending college. Basch (2011a) argued that youth pregnancy and subsequent delivery exerted a greater impact on educational attainment. On the basis of this finding, Basch (2011a) suggested that school-based research and intervention should focus on helping young people to acquire knowledge and skills to negotiate safer sex, to postpone sex, and to avoid unintended pregnancy (see also Basch, 2011b). The transformative power of education for young women is well known. This is because educated young women would most likely promote the education and health of their children and communities, and thus become assets to society (UNESCO, 2014).

The UNESCO (2014) noted that many of the disparities and discrimination that remain in most countries were at the expense of young women, thus preventing them from realising their potential. For example, Nkani and Bhana (2010) showed that, although education policy in South Africa forbids the exclusion of pregnant adolescents from school, school principals sometimes flout this policy by excluding pregnant adolescents from school. In a related investigation in several secondary schools in the Western Cape, South Africa, Bhana, Morrell, Shefer, and Ngabaza (2010) revealed that secondary school teachers had negative attitudes towards in-school pregnant adolescents. Bhana et al. (2010)

reported that teachers were of the opinion that in-school adolescent pregnancy disrupts the adolescent's academic work and also brings sexual shame to the teachers, other students, and the school as a whole (see also Bhana, Clowes, Morrell, & Shefer, 2008).

On the basis of trend analysis of adolescent women's exclusion from school following pregnancy, the UNESCO (2014) forecast that most young women from poor families in Africa would attain only lower secondary completion status by 2111. The UNESCO (2014) highlighted the importance of using sexual health education to transform lives of young people. The education for all (EFA) global monitoring report 2013/2014 of the UNESCO provided evidence to the effect that the education of young people was critical to the achievement of the millennium development goals (MDGs). The UNESCO (2014) argued that attempts to ensure that young people, especially young women, remained in school up to completion might serve as a catalyst to achieve the other MGDs. For example, education, it noted, is a poverty reduction tool that may bring about healthy lifestyles, economic prosperity, gainful employment, and pro-democracy attitudes (UNESCO, 2014). Dropping out of school because of pregnancy requires countermeasures that transcend the frontiers of a school. To mitigate the effect of this social problem, sexual health research and education among in-school youths are warranted (Kirby, Laris, & Rolleri, 2007; Kleinert, 2007; Lillie, Pulerwitz, & Curbow, 2009; Lloyd et al., 2012; Mason-Jones, Mathews, Kagee, & Lombard, 2011; Pascoe et al., 2010).

The influence of adolescent pregnancy on school attendance is not only raising concerns among adults, but also it is raising serious concerns among young people. For example, in a cross-sectional sexual behaviour survey among in-school youths in Kenyan, Adaji, Warenius, Ong'any, and Faxelid (2010) revealed that the majority of study participants (male and female) were of the opinion that young women who become pregnant, while enrolled in school, should not be excluded from school. Interestingly, however, the investigators found that adolescent women participants strongly supported the exclusion of adolescent men from school if they make school-going adolescent women pregnant.

Taken together, there appears to be a clear need to reduce pregnancy-related school dropout among young people worldwide in general, and among Ghanaian youths, in particular. Adolescent pregnancy risk reduction efforts may help young people to attain high educational status. Generally, sexual health-risk reduction interventions may serve to protect young people from adverse sexual health outcomes so they could complete school. The preventive public health advantage these youth sexual risk reduction programmes offer is that they may, in the long term, bring about a healthy population, poverty reduction, and economic empowerment. Similarly, teaching young people, especially adolescent women, to use condoms in order to overcome the pregnancy barrier to good education may serve the useful purpose of eliminating gender disparity in educational access per the millennium development goal (MDG) goal 3 (Unterhalter, 2005; 2013).

Condom Promotion and Use

Condom promotion and condom use have received global recognition despite dissent from some individuals, groups, and religious bodies. In a joint position statement issued in 2004 and reaffirmed in 2009, the WHO, the UNFPA, and the UNAIDS stated clearly that the male latex condom represented the single most effective tool for reducing sexually transmitted HIV, unintended pregnancy, and other STDs (WHO/UNFPA/UNAIDS Position Statement, 2009). Other systematic reviews, conducted to compare the durability and efficiency of latex and non-latex condoms in the prevention of pregnancy, have provided some supporting evidence for this position (Gallo, Grimes, Lopez, & Schulz, 2006; Macaluso et al., 2007). The position of the WHO and its collaborators on the use of condoms was informed by the realities of the HIV/STD response collated from several empirical studies worldwide. Thus, this global position should help scale up sexual behaviour risk prevention among the present young generation, whom Nobelius and colleagues (2012) christened the “condom generation”. The important role condoms play in preventing and controlling STDs and HIV has been well noted (Galvao

et al., 2005; Holmes, Levine, & Weaver, 2004; Maharaj & Cleland, 2006; Padian et al., 2008; WHO, 2007).

Two main types of condom exist — the male condom and the female condom. Several kinds of male and female condoms exist on the market (Beksinska, Smit, Joanis, Usher-Patel, & Potter, 2011; Joanis et al., 2011). However, evidence shows that the latex condom offers the best protection against HIV, STD, and unintended pregnancy. Understanding the determinants of condom use or non-use among young people is critical to designing countermeasures that address those determinants. Research shows that, until recently, condoms had been used primarily for birth control purposes for more than a century (Berman & Kamb, 2007). Evidence also abounds to the effect that both male and female condoms effectively provide dual protection against sexually transmitted infections (STIs) (including HIV) and pregnancy when used correctly and consistently (Cleland & Ali, 2006; Korenromp et al., 2005; Macaluso et al., 2007).

Finally, the case for condom promotion and condom use during vaginal or anal sexual intercourse for protection against HIV and STDs is supported by growing laboratory and empirical epidemiological evidence (Basarge, 2007; Macaluso et al., 2007; Motsoane, Bester, Pretorius, & Becker, 2003; Shoupe, 2006; Valadez et al., 2014; Warner & Stone, 2007; Williams & Fortenberry, 2011). In several systematic reviews and meta-analyses, sexual health researchers have made a strong case for a scale-up of condom promotion in developing countries (Kennedy, Medley, Sweat, & O'Reilly, 2010; Sweat, Denison, Kennedy, Tedrow, & O'Reilly, 2012). Other work has reported positive condom negotiation strategies among young people elsewhere (Tschann, Flores, deGroat, Deardorff, & Wibbelsman, 2010). Also, within the framework of combination prevention strategies, condom promotion has been at the forefront globally. The WHO and UNAIDS encouraged countries with generalised HIV statuses like Ghana (the setting of the present study) to combine condom use with other strategies where appropriate (UNAIDS, 2011). Given this, efforts towards condom promotion and condom use as a way of

controlling the incidence of STD and HIV should provide public health gains in different settings and among different populations (Davis & Weller, 1999; Seal & Palmer-Seal, 1996; Thompson et al., 2002).

Obstacles to condom promotion and use. In public health, as in many other spheres of human social behaviour, politics and religion sometimes influence science. Despite the overwhelming scientific evidence that the condom technology is the most tried, tested, and proven means for controlling HIV, STDs, and unintended pregnancy (Valadez et al., 2014; Weller & Davis-Beaty, 2002; Widman, Noar, Choukas-Bradley, & Francis, 2014), condom promotion and use has been hindered by numerous obstacles, which can be categorised into three broad areas namely religion, hedonism and myths, and partner-type.

Religion and condom use. The Roman Catholic Church is estimated to have about 1.2 billion followers worldwide. The Church views condoms as an anti-procreation technology, prohibiting its members from using condoms (Benagiano, Carrara, Filippi, & Brosens, 2011; Editorial, 2008; 2009). Despite the past three decades of rigorous scientific research on the efficiency and effectiveness of condoms in preventing sexual risk behaviour, the position of the Roman Catholic faith remains unchanged (Bovens, 2009; Editorial, 2006). In contrast, other Christian faiths have engaged with the HIV epidemic and their impact on the HIV response has been noted (Dilger, Burchardt, & van Dijk, 2010; Gusman, 2009). As with other places in the world, the Roman Catholic Church in Ghana has a large following. It is unclear if the reported low rate of condom use among young people in Ghana is partly attributable to the Church's position, especially for youths who are members of the Church.

Hedonism, myths, and condom use. Hedonism, or what is popularly called the "pleasure principle", is known to affect condom use. Other myths that make condom use unattractive to many young people have also been reported. Previous investigations have reported that hedonistic beliefs about condom use remained prevalent among young people in many countries in sub-Saharan Africa

(Buck et al., 2005; MacPhail & Campbell, 2001; Nixon, Rubincam, Casale, & Flicker, 2011; Nobelius et al., 2011; Pool, Kamali, & Whitworth, 2006). This research identified some of the hedonistic beliefs to include the following: the perception that condom use indicates a lack of trust in one's sex partner, the belief that condoms slip, break, and get hidden in women during intercourse, the belief that condoms have holes in them, and the belief that condoms make sex unnatural by reducing sexual pleasure. For example, Tavory and Swidler (2009) provided evidence of the prevalence of hedonistic beliefs about condom use in rural Malawi, and advocated for prevention research to help deconstruct what they called "condom semiotics" among young people (see also Dickinson, 2013).

In a related study, investigators in Namibia found that myths regarding condom use were pervasive among young heterosexual men and women (Mufune, 2006). Mufune (2006) observed that some participants were of the opinion that bad men always made holes in condoms in order to impregnate young women without their knowing it. Other participants said that condoms rendered sexual intercourse unsatisfactory, with some suggesting that young men who produce large amounts of sperm might even burst the condoms (Mufune, 2006). Mufune's (2006) research also revealed that participants perceived the lotion or gel in the condom as the source of the spread of HIV, and believed that some condoms could cause diseases. Mufune (2006) concluded that local stakeholders needed to mount intensive sex education initiatives, focusing on the advantages and usefulness of condoms in reducing young people's risk of STD, HIV, and unintended pregnancy.

In a similar study, Calabrese, Reisen, Zea, Poppen, and Bianchi (2012) examined perceived pleasure loss resulting from condom use among 268 young men who have sex with men in the US, by making them rate their pleasure level with and without condoms during sexual intercourse. Their study showed that the perception and actual pleasure loss associated with condom use demotivated young men who have sex with men from using condoms. Calabrese et al. (2012) advocated for pleasure to be made a key factor in condom manufacturing. More recently, Siegler, Mbwambo, McCarty, and

DiClemente (2012) used a cross-sectional study, employing a novel Negative Condom Beliefs Scale (NCBS) to assess the prevalence of negative condom beliefs in relation to HIV prevention among 370 participants in Tanzania. Results showed that between 35% and 53% of participants believed that condoms had holes in them, contained worms that caused HIV, and that condoms also caused cancer. Siegler et al. (2012) noted that negative beliefs about condoms were pervasive among the study population because two in three participants held negative condom beliefs. In line with other findings in this area, these results highlight the need to use theories with behavioural belief components in order to address prevailing subjective norms regarding negative condom attitudes and beliefs. Such a theoretical framework should help to identify negative condom belief systems among a population group and to provide explanations for predicting and deconstructing them.

In Ghana, hedonistic beliefs and related myths about condom use and about HIV have been reported. This research indicated that negative beliefs and myths about condom use and sexual health-risk prevention were widespread among in-school youths in Ghana. For example, in an earlier study among school-going youths in Ghana, Awusabo-Asare, Abane, Badasu, and Anarfi (1999) found that about 80% of students who took part in the study did not consider themselves to be at risk of HIV, with some participants expressing the belief that "all die be die" (p. 125), (meaning death will come when it will, irrespective of whether the cause is HIV, road and air traffic crash, drowning, gunshots, and so forth.). Similarly, Tenkorang, Gyimah, Maticka-Tyndale, and Adjei (2011) found that young people in Ghana who believed HIV could be transmitted through witchcraft or other supernatural means were less likely to use condoms at their last sexual encounter (see also Tenkorang, 2013). Their finding is consistent with a recent study reporting that many young people in Ghana engaged in sexual risk behaviour without using condoms because they held myths and misconceptions about condoms and their use during sexual intercourse (Fiaveh, 2012).

Fiaveh (2012) investigated the prevalence of condom myths and misconceptions in a sample of 600 university students aged 19-24 years in Ghana. Fiaveh (2012) found that although many students reported knowing about condoms and their role in HIV prevention (60.8%), 20% of the participants held the view that condom use during intercourse was unsatisfactory. These results revealed that many young people in Ghana believed that sexual intercourse involving condom use seemed unnatural, unsatisfactory, and reduced sexual pleasure.

Partner-type and condom use. Growing research has demonstrated that partner-type, as well as its attendant power dynamics, influences condom negotiation and condom use among young heterosexuals (Montgomery, Chidanyika, Chipato, & van der Straten, 2012; Otto-Salaj et al., 2008; van Horne, Wiemann, Berenson, Horwitz, & Volk, 2009; van Loggerenberg et al., 2012; Woolf & Maisto, 2008). In a longitudinal study to examine the influence of partner communication on condom use among 715 young women who took part in an HIV prevention programme, Sales et al. (2012) reported that frequent partner communication significantly predicted both consistency and proportion of sex acts protected by condom use. Other investigators reported that partner-related violence and fear affected condom negotiation among young women (Bonacquisti & Geller, 2013; Panchanadeswaran et al., 2007; Raiford, Wingood, & Diclemente, 2007; Wingood & DiClemente, 2000). For example, Raiford, DiClemente, and Wingood (2009) investigated the influence of fear emanating from partners on condom use among 715 young African-American women aged 15-21 years. Despite the fact that many participants demonstrated good knowledge of STDs, Raiford et al. (2009) observed that, due to fear of their partners, young women were unable to insist on condom use — 89% of these young women, therefore, reported unprotected sexual intercourse. Consequently, behavioural sexual health research guided by a sound theoretical framework may help identify partner characteristics (i.e., partner norms, attitudes, and beliefs) as key components to include in designing sexual health education for young people.

Limitations associated with abstinence. Sexual abstinence-focused sexual health-risk prevention among young people has sparked debate among health researchers. Proponents of abstinence-only sexual health-risk prevention campaigns have expressed pessimism regarding condom promotion and condom use (Milhausen et al., 2008; Oladepo & Fayemi, 2011; Underhill, Operario, & Montgomery, 2007; Winskell, Beres, Hill, Mbakwem, & Obyerodhyambo, 2011). To parry off critical debate, proponents of abstinence-only prevention usually cite cases of condom breakage and slippage to support their viewpoint. On the contrary, opponents of sexual abstinence-only prevention have maintained their standpoint by arguing that reported cases of condom breakage and slippage were primarily due to mechanical faults associated with users and not necessarily with the condom technology itself (Kohler, Manhart, & Lafferty, 2008; Murphy, Greene, Mihailovic, & Olupot-Olupot, 2006; Santelli, Ott, Lyon, Rogers, Summers et al., 2006; Sennott & Mollborn, 2011). Correspondingly, a position paper jointly issued by the Society for Adolescent Medicine (SAM) and the American College Health Association (ACHA) questioned the promotion of abstinence-led HIV prevention initiatives among young people in an era of copious scientific evidence to the contrary (Santelli, Ott, Lyon, Rogers, & Summers, 2006).

Previous work on sexual abstinence and sex cognitions among 365 adolescents aged 12-15 years in a US school showed that sex cognitions explained a large proportion of the variance in adolescent sexual activity (Masters, Beadnell, Morrison, Hoppe, & Gillmore, 2008). Based on these findings, Masters et al. (2008) concluded that abstinence-only sex education among young people would not reduce sexual risk behaviour and young people's risk of HIV and STDs. In a related investigation using qualitative interviews among 42 young people aged 11-17 years, Ott, Pfeiffer, and Fortenberry (2006) found differences in the way young people and adults perceived sexual abstinence. Whereas adults viewed sexual abstinence as a prescriptive moral edict that young people were obliged to subscribe to patiently, young people perceived sexual abstinence as only a developmental stage of life whose

relevance waned once the stage was negotiated. Ott et al. (2006) found that, contrary to adults' expectation of young people to observe sexual abstinence until marriage, young people waited with eagerness to transition into sexual activity before marriage.

Abstinence-only sexual risk reduction programmes have been closely associated with other sexual risk reduction initiatives that encourage young people to make virginity pledges to stay chaste until marriage. There are worrisome signs associated with sexual abstinence programmes and their related virginity pledges. Empirical research has indicated that young people who take part in abstinence-only programmes do not only drift into sexual activity sooner than later, but also they engage in sexual activity with little or no precaution at all (Bond, 2009; Rosenbaum, 2009). Other evidence shows that many of the abstinence-indoctrinated youths do not use condoms at all when they commence sexual activity (Bearman & Brückner, 2005; Williams & Thompson, 2013), making them a sub-population group at risk of adverse sexual health outcomes.

In addition, evaluation research suggests the effectiveness of these programmes is limited (Bleakley, Hennessy, & Fishbein, 2006; Kirby, 2006; Williams & Thompson, 2013). For example, Rosenbaum (2006) assessed the rate of retractions of virginity pledges and their relationship with the sexual histories of young people, using a two-wave longitudinal study design. Results revealed that of the number of participants who made virginity pledges at Time 1, 53% retracted their pledges (and denied ever making a pledge) at Time 2. Pledgers who engaged in sexual activity were found to be three times more likely to deny ever making a virginity pledge (Rosenbaum, 2006). Moreover, Rosenbaum (2006) found that among sexually experienced young people at Time 1 who took virginity pledges, 28% retracted their pledges by Time 2. Rosenbaum (2006) observed that, whereas young people who made virginity pledges were four times more likely to recant them later, those with sexual histories denied them before making virginity pledges they could not later uphold.

More recently, Rosenbaum (2009) investigated sexual abstinence-only and virginity pledge programmes and their impact on 289 youth pledgers and on 645 youth non-pledgers, using propensity score analysis. Pledgers and matched non-pledgers were compared five years later in relation to their self-reported sexual activity as well as test results of sexually transmitted diseases like chlamydia and gonorrhoea. Results of the analysis showed that, five years after the pledges had been made, approximately 82% of pledgers disowned their pledges. Furthermore, Rosenbaum (2009) revealed that pledgers and matched non-pledgers were significantly similar on reported premarital sex, reported cases of STDs, anal and oral sex, and age at first sex. Interpreting the results, Rosenbaum (2009) concluded that pledgers were less likely than non-pledgers to protect themselves against unintended pregnancy, STD, and HIV during sexual activity. From this research, it seems clear that sexual abstinence and its related virginity pledges rarely prevent sexual risk behaviour among young people. Taken together, these findings suggest that condom promotion and condom use among young people are warranted.

Gender Differences in Condom Use

Gender is crucial in understanding the sexual attitudes and behaviour of young people regarding condom use (Broaddus, Schmiege, & Bryan, 2011; Calsyn et al., 2013; Zuo et al., 2012). Several researchers have reported the existence of gender differences in negotiating condom use (Gungor, Rathfisch, Beji, Yarar, & Karamanoglu, 2013; Pearson, 2006; Pulerwitz, Michaelis, Verma, & Weiss, 2010). Prata, Vahidnia, and Fraser (2005) found the existence of gender differences in knowledge, attitudes, and behaviour in a survey of 1,995 sexually experienced youths aged 15-24 years in Angola. In a sample of 665 ethnically diverse university students, Farmer and Meston (2006) observed important gender differences in attitudes towards condom use, self-efficacy regarding condom use, and actual condom use.

However, the findings from many of this gender-based condom use research regarding the influence of gender on negotiating condom use are mixed. Whereas some investigators found significant relationships between condom use and male gender but not female gender, other investigators reported statistically significant associations between condom use and female gender but not male gender. For example, Munoz-Silva, Sanchez-Garcia, Nunes, and Martins (2007) investigated gender influences on the theory of planned behaviour (TPB) components relative to condom use in a sample of 601 Portuguese and Spanish university students. Results showed that, on average, female students scored higher on all TPB components than did male students. However, Munoz-Silva et al. (2007) observed that female students were less likely than male students to request condom use. They found that attitudes were a better predictor of young women's intentions to use condoms, whereas subjective norms and self-efficacy were stronger predictors of young men's intentions to use condoms. Additionally, Boileau, Zunzunegui, and Rashed (2009) constructed gender-specific explanatory models of condom use among 399 in-school and out-of-school sexually experienced youths in Mali, and reported significant gender differences in condom use. The investigators found that more young women (46%) than young men (40%) used condoms at their last sexual intercourse. However, more young women (64%) than young men (32%) were involved in multiple partnerships. Boileau et al. (2009) suggested that gender shapes sexual behaviour and thus should be made a key variable in sexual health-risk preventive research.

Research findings in support of young women's condom use. Male gender is generally perceived to be associated with more sexual risk-taking propensity than female gender (Gungor et al., 2013; Mahalik, Burns, & Syzdek, 2007). Kang and Moneyham (2008) conducted a cross-sectional study among 1,045 Korean college students and found significant gender differences relating to the intentions to use condoms and other contraceptives. They found that female students knew more about contraceptives and condoms and showed more favourable attitudes towards condom use than did male

students. Kang and Moneyham (2008) reported that female students exhibited more positive intentions to use condoms in the future than did male students. Related to this, Zuo et al. (2012) conducted a sexual behaviour survey among 16,554 young people aged 15-24 years in Hanoi, Shanghai, and in Taipei to assess the relationship between gender norms and youth premarital sexual permissiveness. Results showed that young men exhibited more permissive attitudes towards sexual activity and intercourse than did young women. Adolescent men were also found to show more traditional gender-role attitudes to sexual activity than did adolescent women. Similarly, Robertson, Stein, and Baird-Thomas (2006) found among a sample of 523 young people that greater self-efficacy and positive condom attitudes were better predictors of young women's condom use behaviour, whereas only positive condom attitudes were a significant predictor of young men's condom use. They concluded that gender may mask differences in theories that are tested with combined samples of males and females, and therefore called for sexual health-risk prevention related theories to be tested separately for men and women.

Further, prior research has indicated that young women are more active in negotiating condom use than young men (who usually took reactive positions on condom use; Carter, McNair, Corbin, & Williams, 1999). Correspondingly, young men's intentions to use condoms were reported to be stronger only when their female sex partners were very active and assertive (Carter et al., 1999). Olley and Rotimi (2003) found that of 422 Nigerian university students who reported being sexually active, 89% of young women, compared with 70% of young men, were found to have used condoms three months prior to participation in their study, whereas 30% of young men and 11% of young women reported not using condoms before.

Research findings in support of young men's condom use. In contrast, other researchers have reported that young women generally report much lower condom use than young men, and that young women have difficulty buying and carrying condoms on them (Kowleski-Jones & Mott, 1998; Newman

& Zimmerman, 2000). Other explanatory models suggest that young women experience difficulty in condom negotiation because they often engage in sexual activity with older sex partners, a practice commonly referred to in the literature as sexual age-mixing (Chimbindi, McGrath, Herbst, Tint, & Newell, 2010). Holland and French (2012) investigated condom negotiation strategies among a diverse group of college students who were either in no current relationships or were in casual or monogamous partnerships, and observed that young men overall used condoms more frequently than did young women.

Other studies on gender differences in condom use self-efficacy among young people aged 15-24 years in Cameroon showed that 80% of young men, compared with 58% of young women, knew the correct ways of using condoms, and that young women consistently felt shy of purchasing condoms in a pharmacy (Meekers & Klein, 2002). Meeker and Klein (2002) concluded that condom use self-efficacy interventions should be tailored to the needs of young women. Other earlier research has long established that more young men than young women carry condoms in anticipation of sex. Whereas having a peace of mind predicts young women's condom use, worry about contracting HIV determines why young men use condoms with a new sex partner (Juran, 1996). Relatedly, using a longitudinal design, Broaddus, Schmiege, and Bryan (2011) investigated the association of gender-specific constructs with condom use in a sample of 728 young people. Results revealed that young women with only stable intentions at baseline assessment were more likely to use condoms subsequently. For young men, stable intentions directly predicted future condom use. Broaddus et al. (2011) suggested that sexual risk behaviour prevention should be gender-specific in order to address the instability of gender-based condom use intentions.

Taken as a whole, these results highlight the importance of considering gender differences in condom use research among young people. These findings also indicate that the actual direction of the influence of gender on negotiating condom use is inconclusive. On the basis of the aforementioned

research, I included gender in the current research as an important variable to assess its influence on condom use among young people in Ghana.

Summary of Literature Review

From the aforementioned review, it seems clear that young people worldwide, including those in Ghana, remain a vulnerable population group to HIV/STD-risks. Related to this, there appear to be varying predictors of youth vulnerability to sexual health threats across different socioeconomic contexts, age groups, gender, and local communities. It is also evident from this review that, as with other countries, psychological processes are interacting with social processes to render young people in Ghana vulnerable to negative sexual behaviour outcomes and other ill-health. Similarly, this review also suggests that young people's sexual behaviour patterns in Ghana are constantly changing for the worse. Importantly, this review raises several unanswered questions regarding young people's sexual health-risk preventive behaviour. Therefore, in Ghana, as in much of the world, the search for a cure and effective sexual risk reduction strategies to halt and to reduce the spread of HIV and other STDs is on-going.

The growing consistency of sexual health-compromising behaviour of young people in Ghana warrants empirical search for explanations of the determinants of sexual risk-taking. Fortunately, human beings are known to act to prevent ill-health. We therefore need to understand the causes and maintenance of sexual risk behaviour of Ghanaian youths. Why does sexual risk behaviour recur among young people in Ghana? What psychosocial factors explain sexual risk behaviour of young Ghanaians? Why do some young people use condoms but others do not? Are attitudes towards condom use, normative influences on condom use, and self-efficacy beliefs about safe sex behaviour the same for young people, and do these beliefs remain stable over time? How do behavioural intentions link attitudinal, normative, and control beliefs about safe sexual practices of young people to their actual

behaviour? These questions seem difficult to answer without the help of health behaviour theory. This is because health behaviour theory generally guides health researchers to examine how individuals perceive health-risks, and then provides pathways to help change behaviour in response to these perceptions (Glanz, Rimer, & Lewis, 2002).

Evidently, a cumulative science of health behaviour change theory and techniques have been developed (Abraham & Michie, 2008; Catania, Coates, & Kegeles, 1994; McEachan, Lawton, & Conner, 2010; Michie et al., 2013; Munro, Lewin, Swart, & Volmink, 2007). One of these theoretical models is the theory of planned behaviour (Ajzen, 1991). Given that Ghana has a generalised HIV epidemic status, it seems crucial to explore what psychosocial factors determine Ghanaian high school youths' intentions to engage in condom protected sexual behaviour, and whether these intentions, in turn, predict self-reported sexual-risk preventive behaviour over time. Consequently, the current study aimed to use the socio-cognitive constructs of the theory of planned behaviour to understand, explain, and to predict sexual risk preventive intentions and behaviour of young men and young women in Ghana. In the chapter that follows I describe the theoretical framework and provide a justification for the choice of the theory of planned behaviour (TPB) as a theoretical model for this study.

Chapter III

THEORETICAL FRAMEWORK

Introduction to this Chapter

This chapter begins with a presentation of the theory of planned behaviour (TPB) as a theoretical framework for the present study. Next, the TPB is discussed in more detail relative to its constituent components and other allied constructs that serve to broaden and to expand it. Then an examination of the methodological quality of previous tests of the TPB is made. This examination is followed by a critique of the sufficiency assumptions of the TPB and its applicability to sexual behaviour research across different settings and among different populations. The conceptual and methodological gaps identified are discussed to provide the rationale as to why the TPB warrants further testing with more robust and advanced statistical and methodological techniques.

The Theory of Planned Behaviour (TPB)

The theory of planned behaviour (TPB; Ajzen, 1988; 1991) aims to predict and explain human social behaviour in specific situations. Generally, theory, and for that matter the TPB as a condensed body of knowledge, can be relied upon as a heuristic tool to focus research and interventions. Research indicates that health behaviour theory such as the TPB can lead to the formation of sound assumptions and achievable goals in sexual behaviour research and intervention (Kok et al., 2004). Historically, the TPB is an extension of the theory of reasoned action (TRA; Fishbein & Ajzen, 1975). The TRA was deemed necessary for extension because of its limitations in predicting and explaining overt behaviours thought not to be under complete volitional control (Ajzen, 1991). For example, recent comparative work demonstrated that the TPB framework performed better in predicting condom use intentions of university students than did the TRA (Munoz-Silva et al., 2007). As with much of social psychology,

the TPB places the fully functioning individual at the centre. That is, the individual who possesses adequate capacity to exercise control over his or her own cognition, motivations, and actions. This is also because self-formed habits are putative determinants of most health problems.

The TPB's conceptual roots can be traced to cognitive self-regulation (Ajzen, 1991). The TPB postulates that behavioural intentions are the immediate proximal predictors of target behaviour, and that people's attitudes, subjective norms, and perceived behavioural control indirectly predict behaviour via the mediation (partial or full) of behavioural intentions. In other words, the TPB makes two important assumptions. First, an individual's intentions to engage in a specified behaviour (e.g., abstaining from premarital sex, delaying sexual debut, avoiding multiple sexual partnerships, using condoms consistently) is determined by his or her attitudes, his or her perceived control beliefs, and the prevailing social norms within his or her social context regarding that behaviour. Second, the TPB assumes that the most important determinant of overt behaviour (e.g., condom-protected sexual behaviour) is an individual's behavioural intentions towards that target behaviour.

Attitudes, subjective norms, and perceived behavioural control are held to derive their information from three sources of salient beliefs, namely behavioural beliefs, normative beliefs, and control beliefs (Ajzen, 1991). Central to the TPB is the suggestion that all other things being equal, behavioural beliefs should give rise to attitudes towards a given behaviour while normative beliefs should bring about subjective norms or perceived social pressure regarding that behaviour. Control beliefs result in perceived behavioural control over the performance of that target behaviour (see Figure 3).

The TPB is known to provide a parsimonious way of conceptualising psychosocial phenomena that are considered to be broad. The TPB's components have also been reported to facilitate rapid design and meaningful evaluation of research and intervention. The interpretation and explanation of health and illness are essential because they guide how health threats are perceived and how

behavioural countermeasures are designed to change these perceptions. Attempts to link empirical research with theory and practice are considered sound scientific goals in health research (Glanz, Lewis, & Rimer, 1997; Glanz, Rimer, & Lewis, 2002). Noar and Zimmerman (2005) stated that the use of health behaviour theory in health behaviour change research has two primary goals, namely "(a) a better understanding of health behaviour, and (b) a basis upon which interventions to improve the public health of individuals and communities can be developed and evaluated" (p. 275). A sound health behaviour theory such as the TPB provides researchers and health professionals with a continuum within which to move from theory, through research to practice (Glanz & Maddock, 2000; Glanz, Rimer, & Viswanath, 2008).

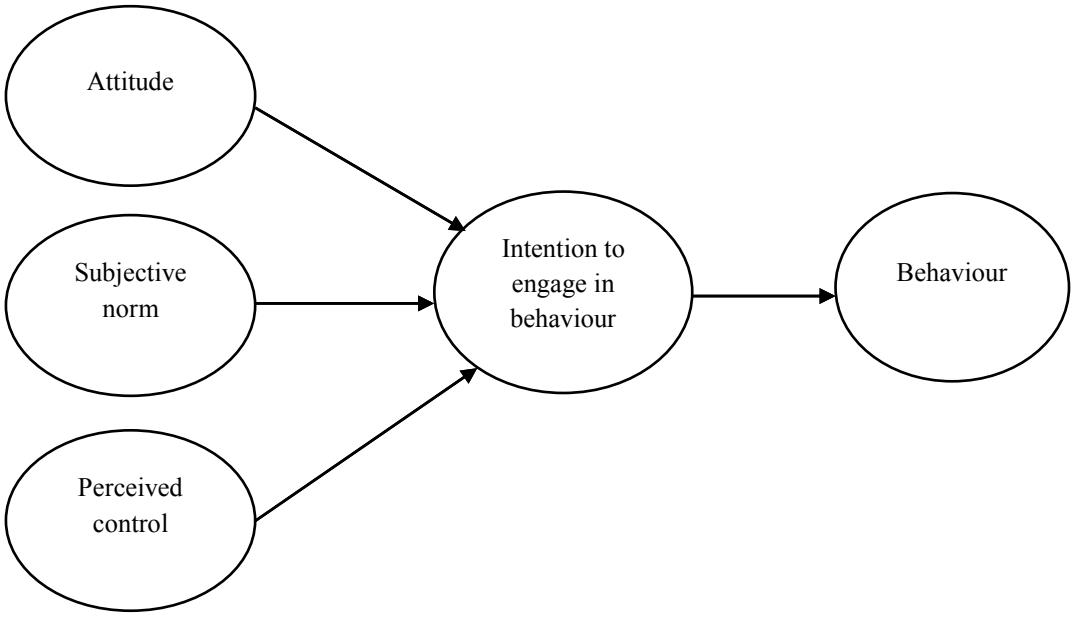

Figure 3. Conceptual diagram of theory of planned behaviour's standard components

Key Components of the TPB

Behavioural beliefs controlling attitudes. Attitudes (A) emanate from behavioural beliefs as a result of information processing that arises from social experience (Ajzen, 1991). In other words,

attitudes can be thought of as an individual's response to prevailing social stimuli. Attitudes comprise people's affective and cognitive appraisal of the disadvantages and advantages of engaging in a particular behaviour. The attitude-behaviour relation is a principal aspect of the TPB model. Ajzen (1991) indicated that the entire TPB model was primarily hinged on the attitude construct. Thus, attitudes towards an object are thought to be processed on a positive-negative continuum such that it is more likely that one would engage with an object linked with attitudes associated with positive outcomes than one would with an object linked with attitudes associated with negative outcomes. Ajzen and Fishbein (1977) described this process as the expectancy-value approach to attitude formation. Put in a slightly different way, a specific behaviour to be performed is cognitively evaluated using a cost-benefit approach, such that people are more likely to perform a behaviour that is believed to bring positive outcomes (rewards). In contrast, a specified behaviour that is believed to bring negative consequences would most likely not be performed.

In the most basic form, the relation between attitudes, on the one hand, and salient beliefs (e.g., engaging in condom-protected sexual behaviour is a responsible act) and the subjective value placed on the outcome of the attitude object (e.g., condom-protected sexual activity prevents unintended pregnancy and HIV), on the other hand, should be understood in terms of proportions. That is, the sum of the product of salient belief (b) and subjective outcome evaluation (e) should be directly proportional to attitude (A) as per Ajzen's (1991) theorising. Therefore, the strength of an individual's attitude towards a specified behaviour is determined by the relative weights of belief strength and subjective value strength. Arithmetically:

$$\text{Attitude} \propto \Sigma \text{ (Salient belief} \times \text{Subjective evaluation of outcome), or}$$

$$A \propto \Sigma\,(b \times e)$$

Normative beliefs controlling subjective norms. Normative beliefs reflect an individual's perception of what significant others, including social groups, in one's social context approve or disapprove of regarding the performance of a specified behaviour (e.g., adolescent sexual behaviour). Thus, subjective norms (SN) derive from normative beliefs and refer to people's perceptions of what important individuals in their life (such as friends, sex partners, teachers, pastors, or parents) approve of and would naturally expect them to engage in, all things being equal. This kind of normative influence has been described as injunctive norms because it is inherent with an imposition of a standard of behaviour (Cialdini, 2003; Jacobson, Mortensen, & Cialdini, 2011; Kredentser, Fabrigar, Smith, & Fulton, 2012). Injunctive norms indicate what ought to be, and serve to mobilise people to perform a given behaviour through the subtle use of reinforcement and punishment (Cialdini, Reno, & Kallgren, 1990; Elek, Miller-Day, & Hecht, 2006; Kallgren, Reno, & Cialdini, 2000).

Given subjective norms' prescriptive nature, it appears, therefore, that individuals feel pressure to comply with the expectations of significant others and/or groups in order to feel accepted and experience a psychological sense of community (Christensen, Rothgerber, Wood, & Matz, 2004; Cialdini et al., 2006; Jensen & Bute, 2010). Failure to comply with the normative standard prevailing in one's social context (e.g., school environment) regarding a specified behaviour may lead to rejection and isolation. A person's cognitive evaluation of perceived social norms' "dos" and "don'ts", and the attendant rewards and punishments that come with these dos and don'ts, are essential in understanding one's decision to approach or to avoid a given behaviour. Thus, the total impact of normative influence on a person is proportional to the sum of the product of normative belief (n) and that person's motivation to comply (m) with the expectation of the significant other or group involved (Ajzen, 1991). Arithmetically:

$$\text{Subjective norm} \propto \Sigma \text{ (Normative belief} \times \text{Motivation to comply), or}$$

$$SN \propto \Sigma\,(n \times m)$$

Control beliefs guiding perceived behavioural control. Perceived behavioural control (PBC) reflects an individual's perception of the difficulty or ease that may be associated with the performance of a specified behaviour (e.g., using condoms consistently during sexual intercourse). Put another way, PBC reflects the subjective degree of control that a person feels he or she has over the performance of a specified behaviour. Conceptually, the PBC construct connotes the belief that people with greater confidence in their ability to execute behaviour are more likely than people with less confidence to perform a specified behaviour. It is the only construct that separates the TPB from the TRA, and which is postulated to influence both intention and behaviour (Ajzen, 1991). Additionally, PBC is believed to strengthen behavioural intentions in the prediction of behaviours that are not under volitional control of the individual or actor (Ajzen, 2002a). That is, behavioural intentions are thought to be more likely to lead to performance of a specified behaviour to the extent that an individual or the actor possesses perceived control over the object of that intention. The perception of control is thought to be enough to motivate action. Therefore, PBC should help power intentions in the prediction and explanation of behaviour as and when volitional control over target behaviour begins to decline (Ajzen, 1991).

An important control belief variable closely related to PBC, and which is often used in place of PBC in relation to sexual risk behaviour, is self-efficacy (Ajzen, 1998; Bandura, 1997). Perceived self-efficacy refers to people's beliefs about their ability to take action against the events that challenge their human functioning with the goal of attaining positive outcomes (Bandura, 1998). Perceived behavioural control and perceived self-efficacy are thought to be similar because both represent an individual's perceived ability towards the performance of a specified overt behaviour (Ajzen, 2002a).

Perceived behavioural control is also associated with the availability or non-availability of necessary opportunities and resources that facilitate the performance of a specified overt behaviour. Put slightly differently, perception of control that is accompanied by important resources such as time, skills, money, social support, and so forth will more likely predict and explain intentions and behaviour

than will perception of control in the absence of these resources (Ajzen, 1991). Therefore, individuals who possess the required resources and opportunities are assumed to perceive more control over their behaviour and overcome perceived difficulty in order to engage in a given behaviour (Ajzen, 1991). These conditions are thought to be necessary and sufficient for the performance of target behaviours. In sum, the magnitude of a person's perception of control derives from the sum of the product of control belief (c) and perceived power (p) according to Ajzen (1991). Arithmetically:

$$\text{Perceived behavioural control} \propto \Sigma\ (\text{Control belief} \times \text{Perceived power}), \text{ or}$$

$$PBC \propto \Sigma\ (p \times c)$$

Behavioural intentions. Intention-behaviour correspondence is a central part of the TPB. Intentions represent an individual's motivation to perform a specific behaviour, thus reflecting a willingness and preparedness on the part of individuals to perform a specified behaviour (Ajzen, 1991). Therefore, the stronger the intentions an individual or actor has towards a specified behaviour that is perceived to be under volitional control (e.g., purchasing and carrying condoms in anticipation of sex), the greater the chance that that behaviour would be carried through (Ajzen, 1991).

Overt behaviour. In general, we can observe and interpret a person's overt behaviour within time and space. Thus, behaviour represents any specified or well-defined overt action that is performed in a specific context. The hypothesised relationships of the TPB components postulate that overt behaviour, which is well-defined and context-specific (e.g., carrying condoms in one's purse to a party), ought to be the ultimate object of behavioural, normative, and control beliefs (Ajzen, 1991). Taken together, people who have favourable attitudes towards a specified behaviour, positive subjective norms regarding a specified behaviour, and who perceive themselves to have the necessary control over performing that specified behaviour, are more likely to execute their behavioural intentions when the need arises (Ajzen, 1991). All other moderator influences on intentions to perform

that specified behaviour are hypothesised to be mediated by attitudes, subjective norms, and perceived control/self-efficacy.

Empirical Tests of the TPB

Application of the TPB to health behaviour. Evidence supporting the predictive utility of the TPB as a model of human health behaviour comes from several meta-analyses and systematic reviews (Albarracin et al., 2001; Albarracin et al., 2004; Armitage & Conner, 2001; Conner & Armitage, 1998; Cooke & French, 2008; Godin & Kok, 1996; Hagger et al., 2002; Schulze & Whittmann, 2003; Sheeran & Orbell, 1998; Sheeran & Taylor, 1999; Sheppard, Hartwick, &Warshaw, 1988). These meta-analyses and systematic reviews show that the TPB predicts and explains between 40% and 49% of the variance in intentions and between 26% and 36% of the variance in overt behaviour. Furthermore, the predictive utility of the TPB has been demonstrated not only in quantitative-based meta-analyses and systematic reviews (Armitage & Conner, 2001), but also it has been demonstrated in qualitative-based systematic reviews (Bennett & Bozionelos, 2000).

In addition, the TPB's predictive utility has been demonstrated across a wide variety of overt behaviours and behavioural intentions. The majority of these overt behaviours and behavioural intentions focus on reducing health-compromising behaviour such as smoking cessation (Smith, Bean, Mitchell, Speizer, & Fries, 2007), binge-drinking (Johnston & White, 2003), exercise behaviour (Karvinen et al., 2007), dietary behaviour (Povey, Conner, Sparks, James, & Shepherd, 2000), jaywalking behaviour (Xu, Li, & Zhang, 2013), and weight control (McConnon et al., 2012). Other investigators focus on non-health behaviours such as recycling behaviour (Tonglet, Phillips, & Read, 2004), consumer behaviour (Kim & Karpova, 2010), unethical behaviour (Man, 1998), hunting behaviour (Hrubes, Ajzen, & Daigle, 2001), and electronic device usage (Hsu & Chiu, 2004). The TPB

framework's applicability to health and non-health behaviours has been undertaken across many settings and among many population groups.

Importantly, the TPB's application to human health behaviour remains its central contribution to health psychology. This is not surprising because proponents of socio-cognitive models of health behaviour change have long recognised the capacity of human beings to act to prevent ill-health or to contract diseases such as HIV/AIDS (Sarafino, 2004). Taking action to prevent ill-health or to contract illness largely involves the interaction of psychological processes with social processes. Health psychologists aim to reduce health-compromising behaviour and to encourage health-enhancing behaviour through the use of behaviour modification strategies that counter health-risk cognition and behaviour of individuals. Recently, health behaviour researchers have argued that behaviour is crucial in understanding most health threats because of its implication in a broad spectrum of leading causes of death such as HIV/AIDS, cardiovascular diseases, lack of physical activity, diabetes, poor diet, tobacco use, and substance use (Fisher et al., 2011; Johnston & Dixon, 2008; Mokdad, Marks, Stroup, & Gerberding, 2000; Parkin, Boyd, & Walker, 2011).

Related to this, sexual behaviour trends, coupled with the leading causes of death of the past decade, a decade rightly named by behavioural scientists as the "Decade of Behaviour (2000-2010)", have made the recourse to behavioural theory to understand human health-compromising behaviour all the more pressing in this new decade (American Psychological Association, 2000; Johnston & Dixon, 2008). For instance, Fishbein et al. (2001) argued that because HIV infection was primarily the outcome of behaviour, it seemed reasonable to proffer that the only successful primary prevention tool against new infections of HIV would be behaviour change, especially in the absence of a cure or vaccine. Fortunately, there has long been a growing recognition of the invaluable role of health behaviour theory in sexual behaviour research (Ajzen, 1991; Bandura, 1998; Catania, Kegeles, &

Coates, 1990; Fishbein & Ajzen, 1975; Fisher & Fisher, 2000; Glanz et al., 1997; Noar & Zimmerman, 2005; Prochaska & DiClemente, 1983; Rogers, 1975; Rosenstock, 1990; Schwarzer, 1992).

It is in line with these behaviour-related health problems, and the goals of health psychology, that the TPB aims to identify key risk and protective behaviours and other factors that influence health and illness. The TPB's tenets ensure that the health behaviour to be explained must be specific, and the intentions to perform it must be characteristically related to the specificity of the intended behaviour (Ajzen, 1991). Thus, the TPB framework provides researchers and health professionals with systematic and clear guidelines to inform research and intervention. Behavioural interventions are essential components of preventive public health goals (Glanz & Bishop, 2010). Linked to this aim is the popular notion that a good socio-cognitive theoretical model should sufficiently predict behaviour, account for ways of reducing health-compromising behaviour, and explain ways of promoting health-enhancing behaviour (Fishbein, 1997; Michie, Johnston, Francis, Hardeman, & Eccles, 2008).

Consequently, some public health departments have reported the efficacy of using social and behavioural science theory such as the TPB to guide health promotion and disease prevention (Shinn et al., 2003; van Devanter et al., 2003). Based on the growing influential role of behavioural interventions, some health behaviour researchers have gone beyond writing about health behaviour theory such as the TPB, and have presented accumulated knowledge and evidence regarding behavioural theory relative to health interventions to politicians and policy-makers (Michie & West, 2013). Another pivotal strength of the TPB lies in the fact that many of its constructs seem to be amenable to change. For example, if attitudes and subjective norms are found to be crucial risk or protective factors for a specified health behaviour (e.g., serial monogamy or multiple sexual partnerships), these attitudinal and normative beliefs can be deconstructed and altered, using appropriate behavioural interventions. If the intervention proves successful, these constructs can then be applied in novel settings and among novel populations.

Popularity of the TPB as a social cognition model. The popularity of the TPB among the social cognition models has long been noted (Olson & Zanna, 1993; Sheppard, Hartwick, & Warshaw, 1988). A literature review of 58 behavioural applications of the TPB to verify its efficacy in accounting for health-related behaviour found that behavioural beliefs and control beliefs were significant predictors of behavioural intentions, whereas behavioural intentions explained overt behaviour accurately, as postulated by the theory (Godin & Kok, 1996). Other investigators have reported similar findings (Conner & Sparks, 1996). Thus far, the empirical reach of the TPB as the most cited and the most investigated social cognition-based health behaviour theory in history has not been called into question (Ajzen, 2011). For example, in an editorial reflecting on the applications of the TPB since its introduction some three decades ago, Ajzen (2011) noted that, by all known objective measurements in human history, the TPB remained the most cited and most influential theoretical model regarding the prediction of human social behaviour.

Other investigators working independently posited that the predictive validity of the TPB model was consistently superior to other theoretical models of health behaviour in predicting and explaining health outcomes (Armitage & Conner, 2000; Hardeman et al., 2002; Sheeran & Taylor, 1999). Relatedly, systematic reviews and meta-analyses show that the TPB is logically consistent, and thus has superior validity to the other known health behaviour theories regarding their applicability to health-risk behaviours in many settings, and among many populations (Glanz et al., 2008; Madden, Ellen, & Ajzen, 1992). For example, a recent longitudinal study to compare the predictive power of the health belief model (HBM) with the TPB in relation to explaining young women's intentions to take human papillomavirus vaccine revealed that the TPB demonstrated consistently greater explanatory power than did the HBM (Gerend & Shepherd, 2012).

Application of the TPB to human sexual behaviour. A substantial number of empirical investigations have used the TPB as a vehicle to understand, explain, and to predict human sexual

behaviour. These studies have found empirical support for the TPB's components among many different populations, and in many countries around the world (Armitage & Conner, 1999; 2001; Basen-Engquist, 1992; Corby, Jammer, & Wolitski, 1996; Jemmott III, Jemmott, & Hacker, 1992; Terry & O'Leary, 1995; White, Terry, & Hogg, 1994). For example, Albarracin et al. (2001) conducted a meta-analysis of 96 studies with a total sample size of 22,594, examining the predictive utility of the components of the TRA and TPB regarding their application to condom use. Their meta-analysis yielded the following statistically significant associations: attitudes with behavioural intentions (r = .58); subjective norms with behavioural intentions (r = .39); attitudes with behavioural beliefs (r = .56); subjective norms with normative beliefs (r = .46); perceived behavioural control with intentions (r = .45); and perceived behavioural control with actual condom use behaviour (r = .25). All associations were significant at (p < .001). These findings suggest that the TPB and its precursor (TRA) are important health behaviour models to use to guide sexual risk behaviour research and intervention, especially condom promotion and condom use.

Albarracin et al. (2004) examined the relationship of study participants' characteristics with attitudes, subjective norms, perceived control, intentions, and overt behaviour (TPB model constructs) in relation to condom use in a meta-analysis of 58 studies that involved 30,270 participants. They found that control beliefs were strongly associated with participants that identified with a social group that had less power, young people, female participants, ethnic-minority groups, as well as participants with low educational status. In contrast, Albarracin et al. (2004) reported that subjective norms associated strongly with male participants, ethnic majority groups, participants with high educational levels as well as those who had received information they needed from their social support networks.

Furthermore, Bennett and Bozionelos (2000) conducted a qualitative review of the application of the TPB to condom use research and intervention. This qualitative review included 20 studies. The association between intentions to use condoms and self-reported condom use behaviour was found to

range between (r = .16 to r = .52). The correlation between attitudes towards condom use and intentions to use condoms ranged between (r = .27 and r = .61), whereas correlations between subjective norms and intentions ranged between (r = .23 and r = .61). Each of these associations was significant at (p < .01 and p < .001). Their review indicated that of the five model components of the TPB, attitudes were the most potent predictor of behavioural intentions. As with other conclusions from quantitative meta-analyses of TPB-based condom use studies, Bennett and Bozionelos (2000) concluded that the TPB remained a powerful social cognition model for informing condom use research and intervention.

Given the important role that sexual risk behaviour plays in understanding adolescent sexuality, many researchers have considered the determinants of sexual health-compromising behaviour as key factors to elucidate using the TPB's framework. To achieve this objective, a meta-analysis of prospective applications of the TPB to a wide range of health behaviours was carried out using 237 studies obtained from 206 journal articles (McEachan, Conner, Taylor, & Lawton, 2011). Meta-analytic results indicated that behaviour type related strongly to the TPB. For example, compared to the explained variance for exercise behaviour (23.9%) and dietary behaviour (21.2%), the TPB explained between 13.8% and 15.3% of the variance in health risk behaviour, safe sex behaviour, and sexual abstinence. Moreover, McEachan et al. (2011) noted that the TPB framework performed better among adolescent samples in relation to sexual abstinence behaviour than it did among other population groups. Other studies have found support for the postulated relations among the TPB's social-cognitive constructs. To highlight the empirical scope of the TPB in relation to its application to human sexual behaviour research, I organise the review that follows by continent.

Application of TPB to sexual behaviour research in Africa. The TPB model, as well as its precursor, the TRA, has been successfully applied to the study of HIV-risk preventive behaviour among young people in sub-Saharan Africa (e.g., Bosompra, 2001; Bryan, Kagee, & Broaddus, 2006;

Heeren, Jemmott III, Mandeya, & Tyler, 2007; Jemmott et al., 2007). As an example, Bryan et al. (2006) tested a TPB-based model to predict intentions of South African adolescents towards condom use and actual condom use. Participants were 261 high school students from Cape Town who completed paper-and-pencil survey questionnaire at two-time points with an interval of 4 months between the two measurement occasions. As predicted by the TPB, Bryan et al. (2006) obtained support for the TPB model, with intentions explaining 14% of the variance in self-reported condom use behaviour. In the same study, an extended TPB model (i.e., standard TPB constructs with additional related constructs) accounted for 22% and 24 % of the variance in young people's intentions towards condom use and actual condom use behaviour respectively. In interpreting their results, they noted that the TPB was a promising model that could guide the design of sexual risk behaviour interventions among South African adolescents.

In a related test of the predictive efficacy of the TPB to predict and to explain condom use in a South African population, Giles et al. (2005) conducted a survey among 152 young Zulu men and women at two-time points. Giles and colleagues measured all standard TPB components at Time 1 except self-reported condom use behaviour which was measured at Time 2. Results showed that the TPB components predicted and explained 67% of the variance in intentions to use condoms (cross-sectionally). The authors observed that among Zulu young people, subjective social norms emerged as the strongest predictor of intentions to use condoms. Giles et al. (2005) thus recommended the TPB's use in sexual behaviour intervention in communities with strong normative influence. Similarly, Jemmott III et al. (2007) used survey research to test the TPB's predictive validity among 390 Xhosa-speaking school-going young people (mean age: 12.1 years) recruited from public high schools at Mdantsane, South Africa, examining their intentions to use condoms in order to prevent HIV and other sexual health-risks. They found that attitudes and perceived behavioural control were strong predictors of students' intentions to use condoms. Subjective norms did not significantly predict intentions

towards condom use among this Xhosa adolescent sample. Nevertheless, Jemmott III and colleagues (2007) concluded that the TPB might provide a useful framework for designing condom use intervention among a Xhosa-speaking adolescent population.

In Ethiopia, Molla, Åstrøm, and Brehane (2007) examined the applicability of the TPB in predicting condom use among 802 young adult women who completed survey measures at two-time points, spaced three months apart. Theory of planned behaviour components of attitudes, subjective norms, and perceived behavioural control were assessed at Time 1. Self-reported condom use measure was obtained 90 days later (Time 2). Results indicated that the model explained 36% and 5.3% of the variance in participants' condom use intentions and behaviour respectively over time. Additional results revealed that favourable subjective norms towards condom use were more prevalent among participants with previous condom use experience than among those without condom use experience. Molla and colleagues (2007) noted that the TPB model proved fairly robust in predicting Ethiopian young women's intentions to use condoms, but not their actual condom use. Therefore, Molla et al. (2007) argued that the public health benefits of condom use should form an integral part of sexual behaviour interventions among young people in order to make it possible for young Ethiopians to carry their intentions through.

In a related study in Addis Ababa, Fekadu and Kraft (2001) assessed the efficacy of the TPB among 354 sexually active young women aged 15-19 years, recruited from a community population, regarding their intentions to use contraception. Self-reported survey questionnaire was used to obtain data. As would be expected, the TPB emerged again as a reliable predictor of contraceptive use intentions of the young women. Fekadu and Kraft (2001) observed that in the Ethiopian society, subjective norms were found to be the most important predictor of intended contraceptive use. Other analyses undertaken by the investigators showed that contraception experience and perceived

pregnancy risks moderated the hypothesised relationships indicated by the TPB (see also Fekadu & Kraft, 2002).

Other researchers have contributed to the growing empirical legacy of the TPB. The recognition that good sexual health is essential for adolescent well-being seems to have focused researchers' attention on the applicability of the TPB framework. Early work to predict condom use intentions of Zimbabwean male and female students with TRA/TPB-based constructs reported empirical support for the postulated paths of the combined models (Wilson, Zenda, Mcmaster, & Lavelle, 1992; see also Wilson & Lavelle, 1992). Also, in a cross-sectional application of the TPB among 852 Tanzanian high school youths (mean age = 17.8 years), assessing the predictors of condom use to prevent sexual health-risks, Lugoe and Rise (1999) found that the TPB components of attitudes, subjective norms, and perceived behavioural control accounted for 11%, 22%, and 48% respectively of the variance in students' intentions to use condoms. Interpreting their results, Lugoe and Rise (1999) argued that the TPB demonstrated a fairly accurate explanation of condom use intentions of Tanzania adolescents.

In Ghana, Bosompra (2001) used the TRA, a precursor of the TPB, to predict intentions to use condoms among 235 Ghanaian university students and reported 33% explained variance in condom use intentions. Bosompra (2001) observed that subjective norms and perceived difficulty were significantly associated with condom use intentions, with subjective norms emerging as the most important predictor. Bosompra (2001) noted that the elicitation study revealed that the majority of study participants expressed a willingness to comply with the wishes of their significant others (including parents, friends, sex partners, and physicians). Given that subjective norms emerged as the most important predictor of students' condom use intentions, Bosompra (2001) recommended the inclusion of Ghanaian university students' social networks, and of their important others in HIV-risk reduction interventions.

Consistent with previous research findings relating to the TPB, an investigation among a large sample of 15,782 high school youths drawn from Cape Town, South Africa and from Dar es Salaam, Tanzania, undertaken by Schaalma et al. (2009), found 77% of explained variance in school-going adolescents' intentions to use condoms, using the TPB framework. The unique contributions made by each TPB model construct to the prediction of behavioural intention, when the total variance explained by the model is controlled for, were the following: attitudes towards condom use (β = .17); subjective norms regarding condom use (β = .27); and perceived condom use self-efficacy (β = .41). All model relationships were significant at (p < .001). Schaalma et al. (2009) concluded that their findings were similar to those reported by other TPB studies undertaken in Europe and North America, and thus recommended the TPB for study designs that aim to understand correlates of intentions to use condoms in an African context.

More recently, Sacolo et al. (2013) used the TPB framework as a vehicle to understand psychosocial factors associated with young people's intentions to adopt protective sexual behaviours such as condom use and sexual abstinence, using a cross-sectional study design. Participants were 369 students aged 15-19 years from high schools in Swaziland, and completed anonymous self-administered questionnaire. Results of their structural equation modelling analyses revealed that the TPB model provided a good fit to the data. The investigators reported that, whereas subjective norms predicted sexual abstinence intentions more strongly, perceived behavioural control predicted condom use intentions better among this sample of Swazi students. In interpreting their results, Sacolo et al. (2013) argued that their results indicated that the TPB components provided an important theoretical framework to use to guide research and intervention involving Swazi school-going adolescents.

Application of TPB to sexual behaviour research in Europe. Gredig, Nideroest, and Parpan-Blaser (2006) assessed condom use as an HIV-risk preventive behaviour among 982 German-speaking Swiss heterosexual young men in a community sample, using the standard components of the TPB.

Measures of model constructs were based on a longitudinal design and were obtained in December 2002 and in June 2003 (6 months interval) with computer-assisted questionnaire-based telephone interviews. The main outcome variables were participants' intentions to use condoms and actual condom use behaviour in sexual encounters involving new sexual partners. As predicted by the TPB, results showed that attitudes and perceived behavioural control statistically significantly predicted participants' intentions to use condoms over time. Condom use intentions, in turn, statistically significantly predicted actual condom use involving new and casual sexual partners. Gredig et al. (2006) observed that subjective norms failed to predict condom use intentions over time and thus called for more empirical work on the TPB.

However, intervention research to promote condom-carrying as preparatory safe-sex behaviour among adolescents in the United Kingdom, using the TPB, reported evidence for the predictive ability of the components of the theory (Armitage & Talibudeen, 2010; see also Conner & Flesch, 2001; Sutton, McVey, & Glanz, 1999). Other investigators working independently have reported similar supporting evidence for the TPB's components. Yzer, Siero, and Buuk (2001) investigated the decision to initiate condom use discussion and actual condom use with a new casual sexual partner in a Dutch community sample aged 15-45 years. They also examined whether this preparatory behaviour was associated with intentional or habitual behaviour, using a TPB-based theoretical framework. Yzer et al. (2001) found that standard TPB constructs, together with bringing up condom use discussion, predicted intentions to use condoms. They also found that habitual behaviour was essential to predicting safe sex practices in the Dutch youth population.

To identify psychosocial determinants of condom use intentions among 69 students from an automobile mechanic school, Lavoie and Godin (1991) applied the TPB's theoretical framework and reported explained variance in condom use intention to be 53%. Schaalma, Kok, and Peters (1993) conducted a cross-sectional study to determine the correlates of consistent condom use among 1,018

high school youths aged 12-19 years from 18 Dutch high schools in the Netherlands. Students completed measures of attitudes, perceived social norms, and self-efficacy in relation to condom use to prevent HIV infection risk. Schaalma et al. (1993) found that the three components of the TPB significantly predicted students' intentions to use condoms, highlighting the importance of promoting positive condom use attitudes among school-going adolescents. Moreover, they recommended sexual assertiveness skills training for students so that they could negotiate social pressures brought to bear on them to engage in sexual risk-taking. Schaalma et al. (1993) also suggested the need to build students' skills such that they could confidently purchase condoms, use them, and carry condoms with them in anticipation of unplanned sexual activity.

Rise (1992) explored intended condom use decisions among a random sample of 3,000 Norwegian adolescents aged 17-19 years, using model components of the TRA, a precursor of the TPB. Results showed that subjective norms predicted participants' intentions to engage in condom-protected sexual intercourse more strongly than did the other components of the TRA. Subjective norms explained 47% of the variance in intentions to use condoms at a future sexual intercourse, whereas attitudes accounted for 23 % of the variance in condom use intentions. Rise (1992) observed that young Norwegians' decision to use condoms or not to use was primarily under normative control. Based on this finding, Rice (1992) concluded that efforts to reduce sexual risk behaviour among Norwegian youths should employ persuasive communication strategies that address normative pressures on young people (see also Myklestada & Rise, 2008).

In a related investigation, Reinecke, Schmidt, and Ajzen (1996) examined condom use intentions and actual behaviour in a sample of 650 German youth, using a two-wave longitudinal study design with one year interval between waves. In accordance with the postulated relations of the TPB components, attitudes towards condom use, subjective norms regarding condom use, and perceived behavioural control over condom use were strongly associated with condom use intentions over time.

Behavioural intentions accounted for 10% of the variance in the sample of young German students' actual condom use.

Application of TPB to sexual behaviour research in North America. To examine whether preparatory behaviours such as discussing safe sex, obtaining condoms, and carrying condoms mediate the paths predicted by the various TPB components, Bryan, Fisher, and Fisher (2002) conducted a study among sexually experienced students sampled from two different populations (high school students and college students) from predominantly minority high schools and colleges in the United States. A sample of 226 students was drawn from an inner-city high school and the other sample of 160 students was drawn from a college. Results revealed that the original TPB model relationships, as well as additional mediational hypotheses regarding preparatory behaviours, were supported. Bryan et al. (2002) reported that gender did not have significant influence on their mediational hypotheses (see also Jemmott III, Jemmott, & Hacker, 1992, for similar findings supporting the TPB among African-American high school students).

Similarly, in a recent test of the TPB among 141 Spanish-speaking Latino adolescents, assessing their preparedness to engage in sexual intercourse and to use condoms in three months' time, Villaruel, Jemmott III, Jemmott, and Ronis (2004) reported empirical support for the model specified by the TPB (see also Malcolm et al., 2013). Rosengard et al. (2001) examined the decision-making process of adolescents regarding their intentions to use condoms to prevent adverse sexual health outcomes in a sample of 236 sexually active adolescents (aged 14-18 years) who attended an STD screening clinic in San Fransisco. Participants completed self-report measures on condom attitudes, social norms regarding condom use, self-efficacy for condom use, intentions to use condoms in the future, health values, and other socio-demographic variables. Results indicated that the extended TPB model (i.e., a model made up of standard TPB components plus other conceptually-related constructs) significantly related to condom use intentions with both casual ($r = .41$; $p < .01$) and steady ($r = .18$; $p < .01$) sexual

partners. Rosengard et al. (2001) argued that the inclusion of health values in TPB-based sexual behaviour research and intervention involving adolescents would help to enhance the theory's predictive efficacy greatly.

Moreover, Fazekas, Senn, and Ledgerwood (2001) assessed undergraduate heterosexual young women's intentions to use condoms with a new sexual partner, using a battery of questions based on TPB components. As predicted by the theory, results showed that the model was useful in explaining heterosexual female students' intentions to use condoms with a new sexual partner. Fazekas et al. (2001) highlighted the importance of considering the TPB for HIV prevention programmes for young female students. In addition, to predict sexual activity among high school youths with and without prior sexual experience, Gillmore et al. (2002) studied the precursor of the TPB, the theory of reasoned action, focusing on participants' attitudes, subjective norms, intentions and actual behaviour. Participants were 749 non-Hispanic European-American students, with approximately 53% of them being young women, who completed survey measures at two-time points. Results demonstrated statistically significant associations between TPB model components—paths from attitudes and subjective norms to behavioural intentions and then from intentions to actual behaviour were significant over time. Gillmore et al. (2002) noted that students with prior sexual experience were more likely than their counterparts without prior sexual experience to engage in sexual intercourse. However, the investigators found no differences between male and female students regarding their intentions to engage in sexual intercourse.

In a related study, Craig et al. (2000) used the TPB as a theoretical framework to understand the intentions of 705 Canadian high school students to use condoms and other contraceptives. Results showed that overall the model explained a maximum of 45.8% of the variance in students' intentions to use condoms. Craig and colleagues (2000) observed that, whereas attitude was a strong predictor of intentions among adolescent men and women, the effect of subjective norms and perceived behavioural

control each was moderated by gender. Craig et al. (2000) concluded that attempts to create positive attitudes towards condom use by way of intervention should help students adopt condoms and other contraceptive use intentions and behaviour.

There also exists empirical support for the predictive utility of the TPB in relation to sexual risk behaviour among sex workers. Jamner, Wolitski, Corby, and Fishbein (1998) tested the predictive utility of the TPB in accounting for intentions to use condoms among 634 female commercial sex workers in California. They interviewed participants regarding their intentions to insist on condom use with both regular (husbands, boyfriends) and casual fee-paying male sexual partners during intercourse. Participants' attitudes, subjective norms, and perceived control, in relation to condom use with regular sexual partners (husband or boyfriends) and fee-paying male clients, were also assessed. Jamner et al. (1998) reported that attitudes and perceived behavioural control were positively and significantly associated with intentions to use condoms with both types of sexual partners.

Subjective norms were not associated with intentions to use condoms with either regular or casual fee-paying sexual partners. Jamner et al. (1998) noted that female sex workers with regular male sexual partners demonstrated significantly stronger intentions to use condoms with casual fee-paying male partners than female sex workers without a regular male sex partner. Moreover, female sex workers with regular male sex partners had more favourable condom attitudes, perceived greater normative influence to use condoms, and demonstrated greater control over condom-protected sex with fee-paying clients than did female sex workers without regular male sexual partners. Jamner et al. (1998) reported that the standard constructs of the TPB accounted for a total of 44% of the variance in intentions to use condoms with regular partners and 47% of the variance in intentions to use condoms with fee-paying clients.

Previous investigation to determine the effect of attitudes, subjective norms, and self-efficacy on high school students' intentions to engage in HIV-risk preventive behaviour found support for the

predictive validity of the TPB-based model (Basen-Engquist & Parcel, 1992). Participants were 1,720 high school students from Texas who completed survey measures indicating their intentions to reduce the number of sexual partners in the future and to use condoms during intercourse. A linear combination of attitudes, subjective norms, and safe sex self-efficacy accounted for 36.4% of the variance in intentions to reduce number of sexual partners; and 17.0% of the variance in intentions to use condoms was explained by attitudes, subjective norms, and safe sex self-efficacy. Basen-Engquist and Parcel (1992) observed that, whereas attitudes and norms had stronger positive relationship with the number of sexual partners, self-efficacy and condom use intentions were strongly associated with the frequency of condom use among students.

Application of TPB to sexual behaviour research in Australia. The TPB has also been validated in Australia. Using the standard model components of the TPB, Terry, Galligan, and Conway (1993) sought to understand heterosexual students' intentions towards avoiding casual sex, talking to sexual partners about their sexual history, as well as their intentions towards signing up for exclusive sexual relationships (i.e., sexual intercourse with high profile people like celebrities). Participants included 102 sexually experienced heterosexual undergraduate Australian students. They found that both attitudes and subjective norms were significantly associated with students' intentions to avoid casual sex and to ask sexual partners about their previous sexual involvements. Behavioural intentions were found to predict casual sex avoidance behaviour, partner sexual history discussion behaviour, and exclusive sexual relationship behaviour. Also, the results revealed that perceived behavioural control did not predict intentions or actual behaviour for all three safe sex strategies. However, Terry et al. (1993) noted that students with internal control beliefs had a higher probability than students with external control beliefs to demonstrate behavioural intentions and actual behaviour for the three safe sex strategies investigated. Finally, male and female students did not differ significantly on intentions and behaviour regarding the three safe sex strategies.

Rich, Mullen, Sainsbury, and Kuczmierczk (2014) investigated the effect of sexual experience and gender on the theory of planned behaviour components in a sample of 306 adolescents in Australia. Results showed that compared with female adolescents, male adolescents reported less favourable attitudes towards condom use. Adolescent women expressed more favourable attitudes towards condom use. Intentions to use condoms were analysed separately for sexually experienced adolescents and sexually inexperienced adolescents. The analysis revealed that for sexually experienced adolescents, the model explained 47% of the variance in their intentions to use condoms, whereas for sexually inexperienced adolescents, the model accounted for 44% of the variance in their intentions to use condoms. Rich et al. (2014) observed that attitudes and subjective norms were the influential predictors of condom use intentions among the sexually experienced group. Attitudes and perceived risk associated more significantly with the sexually inexperienced group.

White, Terry, and Hogg (1994) employed an extended version of the TPB to the prediction and explanation of safe sexual behaviour practices of 211 sexually experienced heterosexual Australian university students. The safe sexual behaviour outcome measures included consistent condom use during sexual intercourse in a month's time and discussion of condom use with new sexual partners within the same period. The results showed that behavioural and normative beliefs significantly predicted undergraduate students' intentions to use condoms and to discuss condom use with new sexual partners a month later. However, they noted that the normative component of the TPB did not relate strongly enough with intentions and thus suggested its revision.

Application of TPB to sexual behaviour research in Asia. Gu et al. (2009) employed the TPB framework to examine condom use behaviours of 281 female sex workers (who were also drug users) aged 18 years and older in Sichuan and Hunan Provinces, China. Participants were recruited using the snowball sampling technique, and data were collected through individual face-to-face interviews at private locations by physicians. Results revealed that the postulated relationships among all the TPB

components were statistically significant (Odds Ratio (OR) = 0.43-0.68, p <.001). Gu et al. (2009) noted that the TPB framework provided a useful tool to understand condom use behaviours of female sex workers in those two provinces. Consequently, the authors advocated the use of the TPB, in particular, and the development of theory-guided sexual behaviour research in China, in general.

Application of TPB to sexual behaviour with cross-continent participants. Godin and Kok (1996) assessed the cross-cultural predictive validity of three social cognition theories regarding participants' intentions to use condoms with a new partner. Participants were from three ethno-cultural communities in South Asia, English-speaking Caribbean, and Latin America. Of the three theories (TPB, TRA, and Triandis' theory of interpersonal behaviour), Godin and Kok (1996) found that all theories demonstrated strong cultural validity. Results also indicated that the TPB and Triandis' theory predicted condom use intentions more strongly than did the TRA. As a result, Godin and Kok (1996) recommended the use of the TPB components in predicting and explaining condom use intentions and behaviour of individuals across these countries. They argued that the inclusion of personal normative beliefs (personal norms) in the TPB model constructs would further enhance its predictive utility.

A similar cross-continent investigation, undertaken by Heeren, Jemmott III, Mandeya, and Tyler (2007) among 251 South African university students and 160 American university students, reported that the TPB proved useful in guiding sexual behaviour research and intervention among young people. They found that for South African participants, positive condom attitudes, subjective norms, and self-efficacy were good predictors of condom use intentions and behaviour. Heeren and colleagues (2007) also observed that subjective norms and attitudes were more strongly associated with intentions among American participants than among South African students, whereas self-efficacy beliefs predicted the intentions of South African students more strongly than they did predict the intentions of American students. Heeren et al. (2007) concluded that the components of the TPB would be essential in HIV-

risk prevention research and intervention among South African students if interventions focused on developing students' self-efficacy beliefs regarding safe sexual practices.

In the section that follows, I discuss the sufficiency (or lack thereof) of the TPB as a model of health behaviour. In doing so, I take a critical look at its conceptual and practical limitations. I begin by describing the TPB's relationship with health behaviour. Next, I organise the postulated model relationships into sub-themes and evaluate them from both conceptual and empirical perspectives.

A Critical Examination of the Sufficiency Assumptions of the TPB

Despite the general empirical support for the TPB, its sufficiency in relation to the prediction and explanation of human health behaviour has been questioned by several researchers (Beadnell et al., 2007; Conner & Armitage, 1998; Gredig et al., 2006; Hsu & Huang, 2012; Kashima, Gallois, & Mccamish, 1993; Miller, 2010; Ogden, 2003; 2014; Rivis & Sheeran, 2003; Rossi & Armstrong, 1999; Sheeran & Orbell, 1999; Sniehotta, Presseaua, & Araújo-Soares, 2014). A key criticism of the TPB is that it focuses primarily on individual-level risk and protective factors that affect health, neglecting equally important social-environmental factors. This focus is thought to leave out important factors that help explain health behaviour because of the recognition that intrapersonal causes of health rarely exist in a socio-cultural vacuum. Other researchers have questioned the TPB's exclusion of unconscious processes and emotional states thought to influence human behaviour (Conner, Gaston, Sheeran, & Germain, 2013; Sheeran, Gollwitzer, & Bargh, 2013).

Many health researchers and professionals have highlighted the need to tackle the multiple forces that impact human health behaviour (Barrera, Castro, Strycker, & Toobert, 2013; Christensen & Nezu, 2013; Fisher, 2008; Fisher et al., 2011; Masters & Hooker, 2013). Consequently, those who use health behaviour theory have been encouraged to be critical of the theory, and to select health behaviour theory that addresses contextual as well as personal factors that affect health, for the design of health

behaviour research and of intervention (Bartholomew & Mullen, 2011; Noar & Zimmerman, 2005; Sniehotta, Presseau, & Araújo-Soares, 2014). A critical appraisal of health behaviour theory would help advance the goals of psychological science theoretically and practically (Head & Noar, 2014; Nigg & Jordan, 2005; Noar & Head, 2014). It is well known that people do exhibit different behaviour in different settings. Thus, it seems obvious that there is no need stressing the argument that human health behaviour is a function of both individual and contextual factors.

The knowledge that health behaviour is determined by personal and contextual factors is not new in health psychology. For example, to highlight the crucial role of socio-environmental determinants of health behaviour, Lewin (1951) proposed his theory of "ecological psychology", which postulates that environmental factors are central in making or unmaking the person. Notwithstanding this, health psychologists have only recently shown increased interest in the situational forces that affect ill-health. Thus, growing research has highlighted the importance of social context in understanding, explaining, predicting, and changing health behaviour risks of individuals (Emmons, 2000; Frohlich, Corin, & Potvin, 2001; Kaplan et al., 2010; Revenson & Pranikoff, 2005; Sorensen et al., 2003; Tomoaia-Cotisel et al., 2013). It appears this renewed interest in contextual determinants of behaviour is a direct response to the discrepant findings that trait-related models of personality and social cognition models of health behaviour produced when applied to predict health behaviour.

Central to this recent research focus is the argument that human health behaviour should be assessed from both social psychological and social ecological perspectives in order to realise the holistic goals of preventive public health. Consistent with this research focus, Burke, Joseph, Pasick, and Barker (2009) argued that theorising social context in health behaviour theory would provide a multidimensional perspective within which to address health disparities, especially in multi-ethnic settings. An advantage of this multidimensional research focus within health behaviour theory is that it would help move health behaviour research away from victim-blaming. Victim-blaming has

characterised much of social cognition-based research and intervention, including research with the TPB, because this research tends to focus entirely on the fully functioning person (i.e., the person with the capacity to exercise control over his or her thoughts, motivations, and behaviour). This fully functioning individual is thought to operate on an expectancy-value principle, where he or she is expected to demonstrate a near perfect combination of expectancies and task values to initiate and to maintain health-enhancing behaviour.

This view of the fully functioning person reflects what Festinger (1962) called cognitive dissonance, where individuals (as rational human beings) are expected to alter their cognitions or thought processes (e.g., attitudes, beliefs) and align them with their actual behaviour in order to avoid negative outcomes, which arise from attitude-behaviour inconsistencies. Failure to satisfy this requirement on the part of the rational human being often leads to victim-blaming. To further stress the importance of social context in health behaviour research, McCormack et al. (2002) argued that, because contextual factors were rarely considered by many health researchers, especially researchers applying social cognition models, attempts to replicate and to implement research evidence generated from these studies, were often hindered. McCormack et al. (2002) surmised that with important contextual variables missing from many social cognition model-based research reports, interpretability and applicability of findings regarding other variables could only be considered "indicative" of what they purport to explain, because other key interactional elements remained unaccounted for.

Attitude-behaviour correspondence. An important postulate of the TPB is that the attitude-behaviour relation is mediated (either fully or partially) by intention (Ajzen, 1991). Ajzen (1991) revealed that attitudinal beliefs were an essential part of the TPB. In other words, attitudinal beliefs serve to hold the TPB together, and are thus fundamental to the predictive utility of the theory as a model of human social behaviour (Ajzen, 2012). This conviction is consistent with Allport's (1954) belief that much of social psychology hinges on attitudes. Consequently, attitude as a theoretical

concept is considered essential in understanding human social behaviour. Early research has shown that an individual's attitudinal beliefs directly predict his or her overt behaviour, setting aside the meditational hypothesis suggested by the TPB (Bentler & Speckart, 1981; Eagly & Chaiken, 1993; Liska, Felson, Chamlin, & Baccaglini, 1984). However, the direct attitude-behaviour correspondence is often found to be relatively weak. This research finding sparked an attitude-behaviour variability debate that dates as far back as the early 1930s.

In a seminal paper to set the stage for the attitude-behaviour variability debate, LaPiere (1934) provided important insights into attitude-behaviour relationships, using a classic real-world research. To date, LaPiere's (1934) research has shaped social and health psychologists' understanding of the dissonance between people's attitudes and their actual behaviour (Firmin, 2010). Here is the ground-breaking research undertaken by LaPiere (1934). In the 1930s when there was so much anti-Chinese prejudice and stereotyping in the United States, LaPiere (1934) accompanied a Chinese couple on a trip to several states and cities in the US. At each hotel they visited, LaPiere (1934) took secret notes of the particulars of the hotels and the reception accorded them by hotel management and staff. The Chinese couple did not know LaPiere (1934) took secret notes of their experiences. LaPiere (1934) reported that of the many hotels they visited, they were refused service at only one hotel. Generally, LaPiere (1934) rated the treatment and services they received at the various places as above average (i.e., warm reception or that hotel management and staff demonstrated favourable attitudes towards them). On their return from their trip, LaPiere (1934) wrote letters to about 250 of the hotels they visited, asking them if they would welcome Chinese guests to their hotels. Of the 128 hotel owners who responded to LaPiere's (1934) letters, 90% indicated that they would not welcome Chinese guests in their hotels. Interestingly, these were the same hotels that gave them warm reception a few weeks earlier. Based on this finding, LaPiere (1934) concluded that people's attitudes rarely reflect their actual behaviour.

Furthermore, Wicker (1969) demonstrated that direct paths from attitudinal beliefs to overt behaviours were statistically weak, with direct attitude-behaviour correlation hovering around (r = .30; p < .05), with attitudes, at most, accounting for 10% variance in overt behaviour. From this research, it seems clear that the attitude concept as a causal agent of human overt behaviour remains at the centre of an active debate among social and health psychologists. It does not seem that this debate will reach a consensus any time soon, at least, from the current state of the health and social psychology literature. Other literature shows that attitudes are susceptible to change, especially in the face of new information. Bringing clarity to the debate, methodologists have suggested that to proffer that the relationship between one construct and another is mediated by a third variable, represents a tacit admission that a direct relationship between the two theoretical constructs exists in the first place (Little, Preacher, Selig, & Card, 2007). These authors argued that if such a direct relationship did not exist then there would be nothing to mediate. Ajzen and Fishbein (1977) seemed to have agreed with this theorising, though not without a spirited defence.

Moreover, it is to be noted that attitude-behaviour inconsistencies are common in daily life. For example, many health behaviour researchers and professionals have written extensively and have made useful arguments in support of the need for individuals to adopt health-promoting behaviours. Yet, it is common knowledge that a good number among them do, for example, smoke, or fail to exercise, or fail to reduce their sugar intake. The affairs of daily living indicate how attitudes may not always lead to behaviour (whether directly or indirectly), providing some support for the cognitive dissonance theory Festinger (1962) propounded. This knowledge prompted early research into the reciprocal effects of attitudes on behaviour and vice versa. Evidence from this early research revealed that the attitude-behaviour relationship appeared statistically significantly stronger than did the behaviour-attitude relationship (Andrews & Kandel, 1979; Kahle & Berman, 1979).

Intention-behaviour correspondence. The TPB claims that behavioural intention almost always predicts overt behaviour. Given this premise, it would seem, therefore, that in many cases people who intend to perform a specified behaviour (e.g., buying condoms in a pharmacy, carrying condoms to school) would carry out their intentions when the time comes. However, people seldom carry their intentions out (de Visser & Smith, 2004; Sheeran, 2002; Sheeran et al., 1999). Again, empirical data do not consistently support the intention-behaviour relationship, raising important questions about the strength of this relationship. The explanation that intention becomes a more accurate predictor of behaviour when the target behaviour, which is the object of the intention, is fully under volitional control (Ajzen, 1991) does not seem to have done enough to resolve the intention-behaviour controversy.

For example, in a study to investigate the intention-behaviour hypothesis among 164 students who intended to study over a winter vacation, measured at two-time points, Sheeran et al. (1999) showed that the intention construct was unstable. The research revealed that stable intentions were enacted more frequently than were unstable intentions. Sheeran et al. (1999) concluded that the temporal nature of intention stability moderated the relationship between intention and behaviour. Similarly, Sheeran (2002) assessed the strength of the intention-behaviour relationship and suggested psychological variables that might be used to improve the accuracy of the intention-behaviour relation. Based on other evidence regarding the intention-behaviour inconsistency, some researchers posited that the intention-behaviour hypothesis suggested by the TPB constituted a mythology and thus called for its abandonment (Davies, Foxall, & Pallister, 2002).

Researchers have suggested that time perspective or time lag is crucial for understanding the intention-behaviour relationship (Boyd & Zimbardo, 2005; Zimbardo & Boyd, 1999). That is, a relatively short time lag between the measurement of intentions and of actual behaviour may likely predict behaviour. Conversely, a relatively long time lag between the measurement of intentions and of

actual behaviour is thought to be more likely to predict behaviour. Rabinovich, Morton, and Postmes (2010) investigated the influence of time perspective on intention-behaviour relationship in an experimental study, involving 115 university students. Rabinovich et al. (2010) compared participants in the distant-future time perspective condition of five years (i.e., a longer time lag between intention and behaviour) with those in the near-future time perspective condition of one month (i.e., a shorter time lag between intentions and behaviour) relative to their intentions to save money for the future. They found that the distant-future time (i.e., 5 years) yielded a strong positive relationship between intentions and behaviour. The authors observed a significantly weaker association between intentions and behaviour among participants in the near-future time perspective condition. This finding suggests that time perspective may be essential in understanding the theoretical relationships between the components of the TPB. However, in its present form, the TPB provides no firm guidelines regarding the optimal time lag that should pass between measurements of each construct to optimise the strength of the interrelationships, leaving the decision entirely to the discretion of researchers.

Some investigators have focused on identifying other theoretical variables that may help explain people's intentions and how these intentions could be acted out or performed. These investigators have identified other social-psychological variables, not considered by the TPB, which may serve to enhance its predictive efficacy. For instance, past behaviour has been found to predict behaviour over-and-above intentions, and has thus been recommended for inclusion in the theory (Ajzen, 2002b; Ajzen & Fishbein, 2005; Bagozzi, 1981; Hagger et al., 2002; Rise, 1992; Ouelette & Wood, 1998). There is also some evidence that the consistency of past behaviour gives rise to habit (Danner, Aarts, & de Vries, 2008). Goal-directed behaviour and habit (Verplanken & Aarts, 1999; Verplanken, Aarts, Van Knippenberg, & Moonen, 1998; Verplanken, Myrbakk, & Rudi, 2005; Verplanken & Orbell, 2003; Wood, Tam, & Querrero-Witt, 2005) have also been found to bridge the intention-behaviour gap, and have been shown empirically to render behavioural intention a more reliable predictor of overt

behaviour. Recent research found that habit (i.e., past behaviour) predicted future behaviour more strongly than did intentions (Danner et al., 2008).

Another theoretical variable that has been reported to increase the explanatory power of the TPB regarding the intention-behaviour relationships is that of "implementation intention" (also referred to as action planning, goal-intention; Gollwitzer, 1999; Orbell, Hodgkins, & Sheeran, 1997). Implementation intention, as a theoretical construct, suggests that people go beyond mere statement of their intentions to perform a specified behaviour (e.g., I intend to use condoms consistently in the next four months). Implementation intention enjoins individuals to state exactly *how*, *where*, and *when* they intend to perform the specified behaviour. It is argued that with such elaborate and specific planning or commitment, most people are unlikely to refrain from implementing their intention (Gollwitzer & Sheeran, 2006; Webb & Sheeran, 2007). Therefore, implementation intention (or, action planning, goal intention) is held to be a more accurate predictor of overt behaviour than mere intention formation (Sniehotta, Scholz, & Schwarzer, 2005; Ziegelmann, Luszczynska, Lippke, & Schwarzer, 2007).

Efforts to critique extant theory and to provide suggestions are essential to theory building and theory refinement. Given the plethora of health behaviour theories available, theory refinement and integration is preferred to new theory development (Armitage, 2014; Conner, 2014; Head & Noar, 2014; Kok & Ruiter, 2014; Noar & Zimmerman, 2005; Reid & Aiken, 2011). A related, plausible explanation for the intention-behaviour inconsistency is that many people who have already formed an intention to perform a specified behaviour (e.g., a student intending to buy condoms at a community pharmacy) may, when encountering new information (e.g., news that a student was turned away earlier when he tried to buy condoms at that pharmacy), take decisions or make choices that go contrary to, or alter their earlier intentions, preventing the enactment of the object of the intention.

Subjective norm-intention correspondence. Fishbein and Ajzen (1975) posited that subjective norm was a key, direct determinant of behavioural intention. Contrary to expectation, people's

normative beliefs do not reliably predict their intentions to act. Generally, the subjective norm construct is considered to be the weakest predictor among the TPB components (Armitage & Conner, 2001; Johnston & White, 2003; Povey et al., 2000; Trafimow & Finlay, 1996). This is because it seems to lack the predictive ability to explain intention variability across situations and populations (see also Manning, 2009). Additionally, empirical research regarding its predictive efficacy has produced contradictory results. On the one hand, subjective norms have been found to account for substantial variance in intention and to strengthen the capacity of intention in predicting overt behaviour (Albarracin et al., 2004; Armitage & Talibudeen, 2010). On the other hand, other investigators have found a statistically nonsignificant relationship between subjective norms and intention (Jemmott III et al., 2007).

A suggested reason accounting for the weak subjective norm-intention correspondence is that subjective norms are thought to focus exclusively on social injunctive norms, much to the neglect of descriptive norms (group norms) and/or personal norms (White, Smith, Terry, Greenslade, McKimmie, 2009). Personal norms, group norms, and moral norms have been proposed as an alternative to subjective norms, given the empirical evidence that they are good predictors of both intentions and behaviour **(**Harland, Staats, & Wilke, 1999; Jackson, Smith, & Conner, 2003; Johnston & White, 2003; Mason & White, 2008; Parker, Manstead, & Stradling, 1995; White et al., 1994). Related to this, Terry and Hogg (1996) provided evidence suggesting that perceived subjective norms predict behavioural intentions only when individuals identify strongly with a group or person whose norms must guide their intentions to perform target behaviour. Other similar research concluded that perceived social norms led to greater conformity only when people acquired strong group identity, making self-identity a more useful theoretical construct than social identity within the context of the TPB applications (Christensen, Rothgerber, Wood, & Matz, 2004; Terry, Hogg, & White, 1999). These findings raise the question of the stability of the subjective norm construct of the TPB. Taken as a whole, these findings

suggest clearly that for most people, attitudinal and control beliefs remain the major determinants of their intentions to perform target behaviour because of the temporal stability that characterises the subjective norm construct.

Perceived behavioural control-intention correspondence. There is general empirical support for the postulated relationship between perceived behavioural control (PBC) and intentions. Despite this, some investigators have demonstrated that perceived behavioural control sometimes predicts overt behaviour directly, over and above behavioural intentions (Ajzen, 1991). Although Ajzen (1991) noted that the prediction and explanation of behaviour should be a joint function of intention and perceived behavioural control, this appears to be practically difficult to achieve. For example, it is argued that measurement of both intention and PBC ought to be compatible with the overt behaviour of interest and within the same context of that specified behaviour in order to achieve accurate prediction (Ajzen, 1991; 2012; Fishbein & Ajzen, 2010). Again, the specific context and the particular behaviour for which intention alone can predict overt behaviour reliably without assistance from PBC, or when it would be more appropriate to use both constructs, lacks clarity. The attempt to distinguish between "actual" behavioural control (ABC) and "perceived" behavioural control by Ajzen (1991) and Ajzen and Madden (1985), has done little to resolve the confusion. ABC is not usually considered essential in operationalising and in applying the TPB to real-world research because Ajzen (1991) does not provide clear guidelines on how to use it. Ajzen (1991) described "actual" behavioural control as non-motivational factors that include skills, money, time, and social support.

Furthermore, Ajzen (1991) argued that any individual in possession of all these non-motivational resources mentioned above should automatically perform a specified behaviour thought to be under volitional control. The possibility is that people who do not possess "actual" behavioural control (i.e., skill, money, time, and social support) over target behaviour, even behaviour which is considered to be under volitional control, may be unable to perform the behaviour. Ajzen (1991) stated that "the

resources and opportunities available to a person must to some extent dictate the likelihood of behavioural achievement" (p.183). Moreover, Ajzen (1991) suggested that PBC may be used to substitute for "actual" behavioural control. However, this substitution is only thought to depend on the accuracy of an individual's perceptions. How one determines the accuracy of individuals' perception of their control over the performance of a specified behaviour is not provided. Therefore, it appears that the application and interpretation of perceived behavioural control requires some guess work.

A related problem is that the conceptualisation of the PBC construct, which separates the TPB from the TRA, was characterised by much controversy. This is because PBC has consistently been shown to be a multi-dimensional construct, comprising such factors as perceived difficulty and perceived self-efficacy (Hagger & Chatzisarantis, 2005; Kraft, Rise, Sutton, & Røysamb, 2005; Leach, Hennesy, & Fishbein, 2001; Rhodes & Courneya, 2003; Trafimow, Sheeran, Conner, & Finlay, 2002). Thus far, its measurement is characterised by difficulties that have implications for construct reliability. For this reason, many health behaviour researchers tend to be more comfortable replacing the construct of perceived behavioural control with measures of self-efficacy (Bandura, 1998), which is considered to be unidimensional, well-defined and, according to Ajzen (1991), is sufficiently similar to perceived behavioural control.

TPB and pilot work. Ideally, the application of the TPB requires formative research or elicitation study to identify behaviour of interest among the target population group, and in the setting of interest to the researcher. The information obtained from this elicitation study can be used to develop a relevant and descriptive questionnaire to measure the specified behavioural outcome of interest. Specificity of overt behaviour of interest is essential to the TPB (Ajzen & Fishbein, 1977). Consistent with the position taken by many TPB researchers, Montaño and Kasprzyk (2008) argued that the measurement procedures indicated by the TPB, although useful, made the ideal application of the TPB

difficult. They noted that the pilot work inherent in the TPB's application would not realistically support most study designs in relation to their budget, time frame, and ethical approval requirements.

An additional problem inherent in this pilot work is that for every behavioural outcome of interest, there ought to be a new questionnaire because the questionnaire should be informed by formative research. This implicit suggestion regarding novel questionnaires goes contrary to the goals of scientific inquiry. This is because like any scientific inquiry, psychological science seeks, among other things, to provide universal truths in order to allow for the possibility of repeatability or replication. Context-dependent and population-specific questionnaires may not offer opportunities for study replication.

Relatedly, as with much of social psychology the TPB, as noted earlier, focuses primarily on the "rational human being". This emphasis on the rational human being has led to the classification of the TPB and the TRA as the *reasoned action approach* (RAA; Ajzen, 2012; Noar & Head, 2014). It therefore follows that the TPB in its present conceptualisation may not be appropriate for research with individuals suffering from psychopathology. Finally, Ajzen (1991) suggested that the TPB could be considered as an intermediary between two extremes—physiological processes at one end of the continuum, and social institutions at another. Based on this, some literature suggests that many social psychology concepts such as attitudes have no dispositional referents because their conceptualisation excludes the influence of trait elements implicated in human overt behaviour.

In sum, all these limitations of the TPB make a further test of its postulated relations both theoretically and practically important. A further investigation of its constructs would most likely broaden our current understanding of its actual predictive efficacy. This knowledge may help identify other important psychosocial variables, not previously considered by the theory, for its refinement and improvement. It is crucial to note, however, that despite the conceptual, the empirical, and the practical limitations of the TPB (as discussed above), it remains the most influential and the most utility health

behaviour theory, among the dozen health behaviour theories, probably in the history of social psychology (Ajzen, 2011; 2012; 2014; Armitage, 2014; Armitage & Conner, 2001; Conner, 2014; Fishbein & Ajzen, 2010; Kok & Ruiter, 2014; Trafimow, 2014; Schwarzer, 2014). In the section that follows, I present a synthesis of the methodological and statistical limitations inherent in most prior empirical tests and applications of the TPB model listed in earlier sections of this dissertation. To make the discussion meaningful, I draw on useful quotes from the work of important methodologists to punctuate key issues.

Methodological Quality of Previous Tests of the TPB

Taken together, the majority of prior tests of the TPB model are associated with important methodological limitations, emanating generally from their correlational research designs. As a result of these limitations, many of the findings reported in the TPB literature may be biased in some way because these studies seemed more likely to have been influenced by methodological artefacts. The identified methodological limitations associated with existing TPB research are discussed in more detail below.

Statistical tests and TPB applications. Previous tests of the TPB provided empirical evidence for the predictive efficacy of the components of the theory. However, only a few studies employed robust statistical procedures such as structural equation modelling (SEM) to validate the goodness-of-fit of the theory (see Bryan et al., 2002; Bryan et al., 2006; Carmack & Lewis-Moss, 2009; Hagger & Chatzisarantis, 2005; Sacolo et al., 2013, for exceptions). The popular statistical technique employed in most empirical tests of the TPB has been multiple regression analysis. Despite the successful use of multiple regression techniques in various fields of psychology, theory testing requires rigorous statistical tests, especially in an important area such as health behaviour theory testing where, as in any clinical practice, error must be kept to a minimum. Evidence suggests that multiple regression

techniques are not rigorous enough to correct for measurement error; and their use is often associated with some level of difficulty because they only allow tests of model constructs on an equation-by-equation basis (Tomarken & Waller, 2003).

It is well known that almost many psychological variables cannot be observed directly. As such, latent variables (the unobservable, underlying variable of interest or factor that is being measured by a given measuring instrument) are considered central to psychological inquiry (see Bollen, 2002; Borsboom, Mellenbergh, & van Heerden, 2003, for a review), especially in health psychology. Due to the prevalence of multiple regression techniques, and in some cases path analysis techniques, in prior tests of the TPB, the model components were rarely tested as latent variables, although the theory's components are conceptually latent in nature. The use of latent variables or factors has clear advantages over the use of observed or manifest variables in psychological research (Bollen, 2002; Borsboom et al., 2003; McArdle, 2009). For example, latent variable structural equation modelling (SEM) is particularly useful for testing latent variable theoretical models in psychological research, because such techniques are able to correct for measurement error by virtue of using multiple indicators to estimate the latent variable (MacCallum & Austin, 2000; Stage, Carter, & Nora, 2004).

This requirement is in sharp contrast to the traditional multiple regression techniques commonly used in tests and applications of the TPB, which are unable to capture the measurement error component associated with any given measured variable. Consequently, efforts to measure naturally-occurring latent variables such as attitudes, subjective norms, perceived control, and intentions as observed or manifest variables are often associated with various measurement biases, which may yield spurious research findings. Weinstein (2006) made similar observations in relation to health behaviour theory testing:

> Such tests are often biased, overestimating the accuracy of the theories they seek to evaluate. These biases are especially strong when studies examine health behaviors that need to be performed repeatedly, such as medication adherence, diet, exercise, and condom use. Several misleading data analysis procedures further exaggerate the theories' predictive accuracy. (p. 1)

Latent variable structural equation modelling (SEM) techniques provide investigators with modelling flexibility and other advantages. Among these numerous advantages, Chin (1998) highlighted the ability of latent variable SEM to (a) control for a conceptual "third variable"; (b) model associations among several predictor variables and several criterion variables simultaneously; (c) model measurement error; (d) use latent variables of factors, which help to reduce method variance, and (e) to test a priori measurement and structural assumptions. Although latent variable SEM is one of several robust statistical methods (e.g., multilevel modelling techniques, latent growth curve techniques) that may be applicable to the analyses of longitudinal and/or mediation data, and which may be used to analyse TPB-based data, Maxwell, Cole, and Mitchell (2011) suggested that SEM approaches to mediation and longitudinal analyses were much simpler and seemed to reflect conceptually the historical antecedents of mediation analyses in general. These aforementioned reasons motivated the choice of latent variable SEM techniques for use in the present study.

Research designs and TPB applications. The TPB model implies a longitudinal, mediated relationship between its central constructs; specifically, that attitudes, subjective norms, and perceived behavioural control will influence one's intentions towards a given behaviour over time, and that such intentions predict the likelihood of actually engaging in the given behaviour at some point in the future (whether the future be measured in minutes, hours, days, weeks, months, or years, for example). Given this background, an important limitation of prior tests and applications of the TPB to the understanding of sexual behaviour is that investigators used primarily cross-sectional research designs to estimate the

longitudinal mediation effects described by the TPB model. Whereas cross-sectional data may help researchers investigate how dependent variable measures differ among participants who possess varying levels of a predictor variable (between-subject variations), such data fail to capture the temporal relations between the variables over time in theoretical models describing longitudinal relationships.

A growing body of research has revealed that the use of data from cross-sectional designs to estimate longitudinal effects tend to bias the measurement of the true "causal" effects of predictors (Cole & Maxwell, 2003; Kraemer, Kiernan, Essex, & Kupfer, 2008; MacKinnon, 2008; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; MacKinnon & Luecken, 2008; Maxwell & Cole, 2007; Shrout & Bolger, 2002), increasing the potential for spurious results. This is especially true when considering mediation effects, which cannot be assumed to be longitudinally stable on the basis of cross-sectional results. To this end, Maxwell et al. (2011) noted that "a variable that is found to be a strong mediator in a cross-sectional analysis may not be a mediator at all in a longitudinal analysis" (p. 816).

These limitations have not gone unnoticed by scholars in the field of health behaviour research, who have recently begun to express concerns with the widespread use of cross-sectional designs in health behaviour research (Rhodes, 2014; Schwarzer, 2014). Weinstein (2006) argued that cross-sectional and prospective designs used to test the TPB have more than likely produced estimates of current and past behaviour, as opposed to future behaviour. Moreover, Weinstein (2006) expressed more pointed concerns relating to the current state of theory testing within the field of health behaviour research, arguing that:

> It appears that rigorous theory testing, the hallmark of science, is not occurring within the domain of health behaviour research.
>
> Our goal is to demonstrate that the correlations derived from health behaviour research using cross-sectional and prospective designs have substantial and systematic errors when used to evaluate the effects of independent variables and that these errors usually inflate the apparent accuracy of the health behaviour theories that the studies aim to test. (p. 1)

As previously mentioned, the TPB arguably represents a longitudinal theoretical model that describes a set of temporal relationships between various attitudes and intentions, and between intentions and overt behaviour. Thus, arguably, the TPB is better tested using a longitudinal study design, where each of the central constructs of the TPB can be measured across multiple time points. In support of this view, Fitzmaurice, Laird, and Ware (2004) suggested that recent advances in statistical programmes for modelling longitudinal data should encourage health researchers to investigate temporal patterns of change in attitudes and overt behaviour over time. Though not without their own limitations (i.e., that they cannot test true causal assumptions as well as experimental designs), longitudinal research designs offer many advantages over cross-sectional designs. For example, longitudinal designs make it possible for researchers to control for extraneous variables (Gollob & Reichardt, 1991), including measurement error associated with the measured variable, as well as the unexplained variance associated with the latent variable. Moreover, unlike cross-sectional designs, longitudinal designs allow one to better capture the influence of conceptual "third variables", including putative mediators (in the case of the TPB, this would be behavioural intentions), as well as to control for autoregressive relationships (the effect that a variable has on itself over time; Maxwell et al., 2011;

Shrout, 2011; West, 2011). The various factors highlighted in the aforementioned review motivated the decision to employ a longitudinal design (as opposed to a cross-sectional design) in the present study.

Prospective designs and TPB applications. Closely linked to the limitations of cross-sectional research designs highlighted above are the short-comings associated with the prospective methodology that is often applied in TPB research. The SAGE Dictionary of Social Research Methods defines prospective study as:

> A study that follows cases forward in time, measuring attributes at multiple time points. Change is measured by examining differences between each time point or study wave. Unlike experimental designs, prospective designs do not include randomized control groups or experimental interventions. (de Vaus, 2006, p. 243)

Although research designs using prospective measures appear to resemble longitudinal designs, the majority of such prospective studies in the TPB literature have failed to measure each of the central constructs at all measurement occasions (see e.g., Bosompra, 2001; Bryan et al., 2006; Fekadu & Kraft, 2001; Giles et al., 2005; Heeren et al., 2007; Jemmott III et al., 2007; Molla et al. 2007; Reinecke et al., 1996; Schaalma et al., 2009). Cole and Maxwell (2003) described such designs as "half-longitudinal designs" (p. 562). In the TPB literature, such half-longitudinal designs have come in various forms. For example, some TPB studies obtained measures of attitudes, subjective norms, perceived control, and intentions contemporaneously in one wave of data collection (often Wave 1) and then measured self-reported behaviour separately in another wave (often Wave 2; see studies listed at the beginning of this paragraph). Other studies measured attitudes, subjective norms, and perceived control contemporaneously in one wave (usually Wave 1), and measured intentions and behaviour in the other

wave (usually Wave 2; see studies listed at the beginning of this paragraph). In each of these instances, each TPB component is not measured at all time points, hence the half-longitudinal design.

Generally, the problems with research findings emanating from these prospective methodology-based studies are as follows: (a) the contemporaneous measure of attitudes, subjective norms, perceived behavioural control, and intentions serve to bias the effect of intentions because the measurement of both intentions, on the one hand, and attitudes, subjective norms, and perceived behavioural control, on the other hand, occurred at the same time point, and (b) the contemporaneity of the measurement makes it impossible for effects of prior levels of intentions to be partialled out (even where the measurement of attitudes, subjective norms, and perceived control on the one hand and intentions on the other hand does not coincide in time (i.e., measured at different time points, but measured only once each (prior effects of intentions cannot be controlled for either). These shortcomings would be equally relevant when considering the contemporaneous measurement of intentions and behaviour in only one wave, or separately across multiple waves with a single measure obtained for each construct. This situation gives rise to the possible overestimation of model parameters, resulting from errors in the analysis.

Conceptually, research shows that it is more advantageous to test a whole theory simultaneously than to test its constituent parts separately (Hayduk, Cummings, Boadu, Pazderka-Roibson, & Boulianne, 2007; Streiner, 2006). This position finds some support in Gestalt psychologists' view that the whole is greater than the sum of its parts (Duncan, 1979; Hatfield, 2012; Hayes, 2009; Koffka, 1922; 1935; Rachlin, 1995). As an example, in their test of the TPB to predict condom use among high school students in Tanzania and in South Africa, Schaalma et al. (2009) tested only condom use intentions but not self-reported condom use behaviour (i.e., they tested only a part of the entire TPB theory).

Various authors recommend that psychologists interested in the processes through which antecedent factors influence outcome measures (mediation) should measure each construct at a

minimum of three-time points (Cole & Maxwell, 2003; Maxwell & Cole, 2007; Reichardt, 2011). Cole and Maxwell (2003) and Maxwell and Cole (2007) explained that a minimum of three waves of data is required to test the stationarity assumption inherent in longitudinal mediation designs. This would allow researchers to (a) confirm that sufficient autoregressive stability exists for each measure over time, and (b) control for prior levels of the dependent variable on itself (autoregressive effects) when testing for cross-lagged effects (see also, Collins, Graham, & Faherty, 1998; Maxwell et al., 2011; Reichardt, 2011; West, 2011). A complete test of the full longitudinal mediation effects described by the theoretical model of the TPB would require first and second waves of data to examine the paths from attitudes, subjective norms, and perceived behavioural control to intentions, and then second and third waves of data to examine the path from intentions to overt behaviour. In addition, Cole and Maxwell (2003) recommended to researchers to measure all variables at all measurement occasions in order to have the opportunity to partial out any effects that a variable might have on itself (autocorrelation). Failure to measure all constructs at all time-points would produce biased results (Cole & Maxwell, 2003; see also Little et al., 2007).

It is important to recognise that psychological constructs are generally not static. That is, they do not exist at one time and then cease to exist at another time. It is crucial, therefore, to stress the point that model constructs of the TPB are psychological variables, first and foremost, and any longitudinal investigation into their interrelationships should take this into account by measuring each construct across all time points. Several methodologists have emphasised the need to treat all constructs equally in relation to the role of time in modelling (Cole & Maxwell, 2003; Collins et al., 1998; Gollob & Reichardt, 1987; Maxwell & Cole, 2007; Maxwell et al., 2011). Highlighting the central role of time lag between measurement occasions, Selig and Preacher (2009) noted that autoregressive effects and cross-lagged effects were only meaningful when interpreted relative to the observed time lag. Moreover, when undertaking longitudinal research with more than two waves of data collection, it is

important that the time-lags are approximately equidistant in order to test more accurately for stationarity (Cole & Maxwell, 2003). So, in a three-wave longitudinal study, for example, the time lag between the first and second waves of data collection should be identical to the time lag between the second and third waves of data collection. Thus far, no study that examined the components of the TPB at three-time points has been found in the TPB-based sexual behaviour literature.

Mediation designs and TPB applications. Mediation analyses, which technically reflect change over time (Maxwell & Cole, 2007), are essential in social and health psychology (Collins, MacKinnon, & Reeve, 2013; MacKinnon & Luecken, 2008) in particular, because health psychologists often wish to understand how independent variables relate to dependent variables via intervening variables (Rucker, Preacher, Tormala, & Petty, 2011). For instance, how condom use attitudes relate to self-reported condom-protected sexual behaviour via condom use intentions. The TPB inherently implies a mediated relationship between variables over time (i.e., a longitudinally mediated model). Nonetheless, the great majority of prior tests of the TPB rarely investigated this theoretical model as (a) a mediation model or (b) a longitudinal model.

Mediation analyses are useful in psychological research and are specifically warranted in HIV/AIDS intervention research (Bryan et al., 2007). Arguably, mediation analyses, especially in longitudinal studies, have been revolutionalised by the seminal work by Cole and Maxwell (2003). To a very large extent, not only did Cole and Maxwell (2003) provide an important conceptual basis for longitudinal mediation analyses, but they also provided the relevant computational procedures needed to undertake such analyses. Despite these important advances, health behaviour researchers like their counterparts in other sub-fields of psychology, have been somewhat slow in adopting the methodological strategies for testing mediation effects proposed by Cole and Maxwell (2003). Only recently have health and social psychologists considered the crucial role of mediation analyses in understanding human social behaviour in general (see e.g., Swart, Hewstone, Christ, & Voci, 2011),

and health behaviour in particular (see e.g., Bryan et al., 2007; Collins et al., 2013; MacKinnon & Luecken, 2008).

Evidence shows mediation analyses accounted for 37% of the published social psychology literature in 2007 (MacKinnon, Fairchild, & Fritz, 2007). Similarly, Rucker, Preacher, Tormala, and Petty (2011) reviewed articles published between 2005-2009 from two important social psychology journals to examine trends in the application of mediation designs and analyses. They found that 59% of all the studies published between 2005 and 2009 in the *Journal of Personality and Social Psychology* (JPSP) employed mediation analyses, and that 65% of all the studies published in the same period in the *Personality and Social Psychology Bulletin* (PSPB) reported on mediation analyses.

In an editorial to discuss the prevalence of poor methodological practices by investigators, such as the use of cross-sectional data to estimate longitudinal relationships, West (2011) prevailed on researchers, especially psychologists, to use new statistical methods that methodologists have painstakingly provided them with in order to reduce the methodological limitations inherent in their studies. A related work on the use of mediation models in health psychology by MacKinnon and Luecken (2008) echoed similar sentiments when the authors argued that "research questions that ask *how*, *when*, *for whom*, *which*, and *under what conditions* require attention to additional ('third') variables that can explain how two variables are related" (p. S99).

Structural equation modelling (SEM) techniques provide a more effective means of undertaking longitudinal mediation tests (Bryan et al., 2007; Cole & Maxwell, 2003; Hankins, French, & Horne, 2000; Li, 2011). As noted earlier, a minimum of three waves of data is required to allow an investigator to properly test full longitudinal mediation (i.e., the postulated relationships between the predictors at Time 1 (e.g., attitudes, subjective norms, and perceived behavioural control), the mediator at Time 2 (e.g., behavioural intentions), and the outcome at Time 3 (e.g., actual behaviour) while controlling for the autoregressive influence of each variable across each time point. Stated differently, the putative

mediator in this study (i.e., behavioural intentions to use condoms at Time 2) transmits the effects of the independent variables or exogenous variables or predictor variables (i.e., attitudes towards condom use, subjective norms regarding condom use, and perceived behavioural control over condom use at Time 1) to the dependent variable or endogenous variable or criterion variable (i.e., condom use behaviour at Time 3). Each of these considerations motivated the three-wave longitudinal design of the present study.

Theoretical fidelity and TPB applications. From the reviewed TPB literature, there is some evidence that many of the previous investigators rarely remained faithful to the model components suggested by the TPB. On the one hand, some investigators added new related constructs to the five standard model components of the TPB to extend it. On the other hand, investigators have substituted some of the five standard components by one or more new, related constructs. Ajzen (2002b) indicated that the TPB model could be extended by new constructs as far as there was sound theoretical justification for their inclusion. Notwithstanding this, it ought to be noted that the addition to, subtraction from, or replacement of model constructs relative to the original constructs postulated by a health behaviour theory may serve to attenuate either the theory's actual predictive efficacy or serve to amplify its actual explanatory power. Not only does theory testing require fidelity to the postulated relations among model components of the theory, but it also requires fidelity to the original model constructs of that theory (Ajzen & Fishbein, 2004; Marteau & Johnston, 1987; Streiner, 2006). On the basis of this problem, I have chosen to remain faithful to the TPB in the current study by using the actual model components suggested by the theory in order to examine their predictive validity relative to the present sample.

Time perspective and TPB applications. The passage of time between cause and effect is assumed to reflect the notion of causation. Gollob and Reichardt (1987) suggested that the role of time should be made a key consideration in mediation and structural equation models (see also Selig,

Preacher, & Little 2012). For example, research with the TPB revealed that the temporal stability of behavioural intentions moderated the intention-behaviour relation such that stable intentions were found to be more likely to be enacted than were unstable intentions (de Visser & Smith, 2004; Sheeran, Orbell, & Trafimow, 1999). Therefore, to amass credible evidence to establish a "causal effect" of intention-behaviour relation as predicted by the TPB, a longitudinal study design, with at least three waves of data (i.e., satisfying the passage of time prerequisite), are required (Maxwell et al., 2011; Reichardt, 2011; Selig & Preacher, 2009; Swart et al., 2011). However, it seems important to acknowledge that only experimental studies, where the potential influence of "third variable" effects is strictly controlled for, will suffice in testing causal hypotheses.

From the aforementioned research, it seems clear that in mediation models such as the TPB, both direct and indirect "causal effects" need time to unfold. Unfortunately, several tests of the TPB either used data collection time lags that were too long or were too short (i.e., 2 weeks to 6 months). Research shows that with time lags that are too long, the effect of a variable on another may weaken to nonsignificance, whereas with time lags that are too short the effect of a variable on another might not have had sufficient time to manifest (Noar, Cole, & Carlyle, 2006; Sheeran & Abraham, 1994). Other authors have highlighted the importance of time lag in sexual behaviour research (Kauth, Lawrence, & Kelly, 1991). In a systematic review of condom use measurements across 72 studies, specifically examining appropriate time lags for such measurements, Sheeran and Abraham (1994) recommended the use of time intervals that vary between two to three months (see also Noar et al.,2006). Consequently, a three-month time interval between each wave of data collection was used in the present research.

Taken as a whole, it appears these findings and discussions, largely from methodologists, highlight the scope of the problems that attended prior tests of the TPB in the extant sexual behaviour literature. In sum, Weinstein and Rothman (2005) believed that the biased results produced from tests

of health behaviour theories essentially emanated from two broad areas: “weaknesses in the research designs and analyses used in much of this research, and problems with how investigators approach the overall research enterprise” (p. 294). This situation, they argued, contributed to the little progress made in advancing the health behaviour literature. This accumulated evidence regarding biases in methodological and statistical approaches to theory testing deserves the attention of health psychologists and other health behaviour professionals. The methodological procedures used in this study are described next.

Chapter IV

METHOD

Introduction to this Chapter

In this chapter, I first describe the research participants and the sampling procedures used in the present study. Second, I list the measures and describe the sources from which they were obtained. Next, I provide information on the strategies used to optimise the quality of the measurements. Then I address issues relating to institutional review board approvals, ethical standards considered, and to other safety monitoring. To end this chapter, I define the research design used in this study.

Participants

Participants in this study were senior high school students (i.e., 9th to 12th-grade students) from a large municipal, public (i.e., state-funded) co-educational institution in eastern Ghana. The total student population in the 2011/2012 academic year (i.e., the year this data collection commenced) was 1,843 of which 944 (51%) were female and 899 (49%) were male. Official school records showed that the total student population for first-and second-year students (i.e., the population group of interest in this study) as of the 2011/2012 academic year (i.e., the participant recruitment period) was 1,023. This number constituted the sampling frame recruited at the assembly forum (as described in the procedures section below). To be eligible for participation in the present study, students must never have been married and must have attained the age of 14 years prior to participation in the survey at the first wave of data collection (Time 1). They must also have indicated a willingness to participate in the study. Students who did not satisfy these eligibility criteria were excluded from the study. No students reported falling short of the inclusion criteria. Of the 1,023 students originally invited to participate in this study, 983 students completed the survey at the first wave of data collection (Time 1); 956 students completed the

survey at the second wave of data collection (Time 2), three months after Time 1; and 835 completed the survey at the third wave of data collection (Time 3), three months after Time 2 (see Appendix G; for a photo report of a cross-section of study participants completing surveys).

In total, 3.91% of the total pool of prospective participants chose not to participate in the study at Time 1. The rate of participant attrition between Time 1 and Time 2 was 6.55%, and between Time 2 and Time 3 was 18.38%. Data were excluded for completed surveys that could not be matched over all three waves of data collection. Completed surveys that could not be matched had one or more of the following problems: lack of alpha-numeric string identifier, incomplete alpha-numeric string identifier, and surveys with participant names printed on them. A total of 684 fully completed surveys were matched across the three waves of data (n = 335, male students; n = 349, female students). Further, of these matched participants, 266 (38.88%) were "Day-students" (i.e., students living outside the school compound and not fed by the school) and 418 (61.11%) were "Boarding students" (i.e., students living on the school compound and fed by the school). Students were in the age range of 14 to 20 years; the age range reported to be susceptible to sexual experimentation as well as other health risks.

Setting and Study Population

The majority of students in the participating school reside in eastern Ghana and have fairly homogenous background information regarding HIV/AIDS and STD transmission routes and prevention methods. Eastern Ghana is the third largest region according to human population, and the sixth largest region according to landmass (see Figure 4, for map of Ghana with arrowhead showing Eastern Region). Eastern Ghana accounts for 10.7 % of the 24,658, 823 million people living in Ghana (Ghana Statistical Service [Census 2010], 2012). Young people aged 5-24 years represent 43.78% of the total population of eastern Ghana. Approximately 30.40% of the total female population and 32.23% of the total male population are aged 10-24 years (Ghana Statistical Service [Census 2010],

2012; 2013). About 60% of young people aged 15 years and older in eastern Ghana are currently in school (Ghana Statistical Service [Census 2010], 2012; 2013).

Given that eastern Ghana is disproportionately affected by HIV and AIDS (Ghana Aids Commission, 2012), high school students in eastern Ghana are exposed to HIV and STD prevention programmes while enrolled in school. In the participating school, for example, HIV-risk prevention posters had been posted on classroom walls, and large billboards containing HIV-risk prevention information had been erected at vantage points on the school compound. Participants in the present study hail from the major ethnic groups living in eastern Ghana, which include the Akans, the Ewes, the Krobos, and the Guans (Ghana Statistical Service [Census 2010], 2013). Recent census data show that the major occupations of the people of eastern Ghana include mining, farming, commercial transport ownerships, wholesale and retail small-scale businesses, technical work, and professional work. About 59.8% of the population aged 15 years and older in eastern Ghana completed secondary school; less than 10% had post-secondary and higher education; a negligible percentage received vocational and technical education; and 20% had no formal education (Ghana Statistical Service [Census 2010], 2013). From this information, participants in the current study could be described as having a homogenous low socioeconomic background, as they reside in low-socioeconomic status (SES) households in low-SES sub-urban communities.

Sampling Procedures

The research protocol for this study was reviewed and approved by the Health Ethics Research Committee of Stellenbosch University, South Africa (Reference No: S12/06/179) and the Institutional Review Board of the Noguchi Memorial Institute for Medical Research, Ghana (Reference No: DF 22; see Appendices A & B, for ethical approval letters). These ethical approvals from the two countries paved the way for the commencement of this three-wave longitudinal study. The three measurement

occasions, over nine months of data collection, were spaced approximately three months apart. Participants in this study were recruited in their school with the help of the school authorities. First, school authorities received and accepted a permission letter presented to them by the principal investigator. The principal investigator obtained the permission letter from the Director-General, Secondary Education, Ghana Education Service (Reference No: SS86/01/131), Accra (see Appendix C, for permission letter). This permission letter introduced the investigator to the school authorities and requested them to make their students available for the study on the basis of self-selection.

Figure 4: Map of Ghana with arrowhead showing eastern Ghana (Eastern Region)

Note. Map is reproduced with written permission of the *www.mapsofworld.com*

In addition, an introductory letter from the Director-General, Ghana Aids Commission (Reference No: GAC/RC/01F), describing this study as an important contribution to the national HIV response (see Appendix D, for introductory letter), and the study protocol, were presented to the school authorities in support of the request for permission. The school authorities examined the study protocol including the informed assent and consent forms.

Next, students were assembled on the school compound by school authorities and the principal investigator was asked to inform them about the study. A broad description of the aims of the survey was presented to students in order to help them decide whether or not they wished to participate in the study. Students were informed that the confidentiality of their responses and the anonymity of their participation would be assured via the use of a participant-generated alpha-numeric string, which would be used to match surveys across all three time points, while maintaining participant anonymity. Furthermore, students were informed that participation in the current study was voluntary and that they were free to withdraw from the surveys at any point in time before or during survey administration.

Following this information session, school authorities then granted all interested first-and second-year students permission to participate in the study on a day set aside with the agreement of the principal investigator. Purposive sampling was used to recruit study participants. Therefore, as many students as showed a willingness to participate, and who satisfied the inclusion criteria, were recruited via the assembly forum. Because the majority of students were in the boarding house (i.e., they lived on campus far away from their parents), and because of a prohibition on students' use of cell phones on the school compound, school authorities, in collaboration with the school Parent-Teacher Association (PTA), acted *in loco parentis,* giving consent for interested students aged 14 to 17 years, who were not legally eligible to sign consent themselves, to participate in the study. The permission obtained from the Ghana Education Service and from the participating school had a prospective nature as it was sought and granted only once for the entire duration of the study. Third-and fourth-year students did

not participate in this study because they were jointly preparing for the West Africa Senior Secondary Certificate Examinations (WASSCE) at that time and, therefore, were not available. Even if they had been allowed to participate in the first and second waves of data, they would have completed (and left) school before the third wave of data was collected.

Time 1 assessment. The first wave of data collection (Time 1) was undertaken in November 2012. The principal investigator and two trained research assistants distributed informed consent forms, assent forms, and survey questionnaires among study participants class by class. Consent and assent forms were given to participants according to their self-declared ages. Survey instructions required them to complete informed consent and assent forms first and to return them before proceeding to complete the survey questionnaire. Assent and consent forms were completed only once at Time 1. To enhance accurate reporting, the investigator gave a demonstration of how the questionnaire should be completed in each class and encouraged participants to provide honest survey responses to meet the purpose of the study. Participants were encouraged to complete all items even if they were not sexually active. Participants were asked to complete the surveys under conditions similar to their end-of-term examinations. Thus, the investigator instructed participants to not communicate among themselves.

Participants completed surveys in a day during normal school hours. Student participants were fairly fluent in English language (which was the language of the survey questionnaire). This is because English language (i.e., British English) has been the medium of instruction and communication in both public and private senior high schools in Ghana. The principal investigator and the research assistants were on hand to assist some participants in generating their secret alpha-numeric identifiers and also to address any concerns they had such as broken pencils. Completed surveys were collected by the principal investigator and the research assistants. A response rate of 96.09% was recorded at Time 1.

Time 2 assessment. The second wave of data (Time 2) was collected three months later in March 2013. The survey administration followed similar procedures to those used at Time 1. The only

difference is that no informed consent and assent forms were completed at Time 2. This is because participants had already provided informed consent and assent at Time 1 for the entire duration of the study. A response rate of 93.45% was recorded at Time 2.

Time 3 assessment. The third wave of data (Time 3) was collected three months later, after Time 2 data, in July 2013. The survey administration followed similar procedures to those followed at Time 1 and Time 2. A response rate of 81.62% was recorded at Time 3. Survey participants were given small bars of chocolate after each wave of data collection and participants who provided all three waves of data were entered into a draw to win one of three Oxford English Dictionaries.

Strategies used to optimise quality of the measurements. To optimise the quality of the measurements in this study, efforts were made to increase cooperation, elicit honest self-report data, and to reduce social desirability response bias. For example, this study employed a participant self-generated alpha-numeric identification string (see Appendix E, for participant self-generated alpha-numeric string identifier guideline) with the primary purpose of helping to match completed surveys over time, and the secondary purpose of helping to reduce potential social desirability bias in the survey data. That is, by the use of the self-generated identifier, study participants were convinced that no one else, including the prinicipal investigator and his supervisors, could identify their (students) completed surveys. It was assumed that this would encourage them to provide honest data and to prevent them from providing survey responses to meet the expectations of someone (e.g., the principal investigator), either in the form of overstated sexual experiences or in the form of understated sexual experiences.

In addition, it was boldly printed on the survey questionnaire that the responses participants were to provide would be considered to be neither wrong nor right. It was also printed on the front cover of the survey questionnaire that participants' responses might be used to help improve adolescent health programmes and therefore there was the need for them to provide honest information (see Appendix F,

for survey questionnaire). Other strategies included the denial of access to survey completion venues to teachers and other staff of the school during survey administration. Teachers as well as other staff of the school were also not allowed access to survey data provided by their students.

Relatedly, it was also printed on the informed consent and assent forms that study participants would not be paid for the provision of the survey data, although they were informed that they would receive small bars of chocolate at each survey completion. As with the earlier strategies mentioned, this strategy was aimed at discouraging participants from providing data to meet the expectations of the principal investigator or his assistants in order to receive payment for a socially "suitable data". Arguably, while attractive, small bars of chocolate may not be enough to influence senior high school students' thought processes to engage in socially desirable responding because of the perceived benefits they hope to receive (i.e., chocolate). Viewed from this perspective, the above-mentioned strategies of data collection were aimed at ensuring that study participants did not provide responses to satisfy either their teachers or satisfy the principal investigator by projecting "a good-boy" or "a good-girl" image (also known as impression management) of themselves.

Finally, given the length of the 48-item survey questionnaire as well as the informed consent and assent forms study participants had to complete in this study, it was considered that adding a separate social desirability scale such as the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1960; Ferrando & Anguiano-Carrasco, 2010; Ventimiglia & MacDonald, 2012), or even its short form (Barger, 2002; Fischer & Fick, 1993; Loo & Thorpe, 2000; Reynolds, 1982), would result in survey fatigue and stress among respondents. Therefore, no social desirability bias index was used.

Ethical Considerations and Safety Monitoring During Data Collection

The confidentiality of participant responses and the anonymity of participation were ensured as far as it was logistically practicable. Participants were assured that completed surveys submitted would

only be accessible to the investigator and his supervisors. Participants were also informed that no identifying information would be attached to any of the completed surveys during storage, retrieval, and use. To enhance the validity of completed surveys, participants were taken through the generation of the unique alpha-numeric string identifier (see Appendix E, for participant self-generated alpha-numeric string identifier guideline) before each survey completion. The principal investigator gave a demonstration of how difficult it would be for anyone, including the principal investigator and his supervisors, to link them with their completed surveys. Following this demonstration, students indicated their conviction to the effect that it was not possible for anyone to identify them with their completed surveys. It is believed that this conviction served to maximise their participation and to enhance the accuracy of their survey responses because participants indicated that they were satisfied with the quality control system in place for the study. Correspondingly, the anticipated risk of discomfort associated with discussing private sexual affairs (self-disclosure) did not seem to inhibit study participants from completing the surveys honestly.

Furthermore, to ensure safety monitoring, students were informed that should they experience any discomfort or any adverse emotional outcomes as a result of their participation in this study, they should quickly contact their school counsellor who had agreed with the principal investigator to provide counselling services throughout the survey completion period. The school counsellor, a Reverend Minister of the Presbyterian Church of Ghana, was on stand-by in his office on survey completion days, and his cell phone number was printed on the informed consent and assent forms that were completed by study participants. Additionally, the official work phone numbers as well as the email addresses of my two supervisors, those of the Health Research Ethics Committee of Stellenbosch University, and those of the Institutional Review Board of the Noguchi Memorial Institute for Medical Research were printed on the informed consent and assent forms for use by study participants. Throughout the survey administration, no study participants reported to either the principal investigator

or to participants' own school counsellor that they experienced any adverse emotional outcomes in relation to their participation in the present study.

Measures

Demographics. The structured paper-and-pencil questionnaire (see Appendix F) was used to collect demographic information on age, gender, and student status (*Day student* or *Boarding student*). Gender was included in the analyses as an important moderator of the effect of the TPB components. These demographic data are presented in Table 1.

Background variables. Sixteen items adapted from previous research were included in the questionnaire to elicit background information regarding respondents' general protected sexual behaviour (sexual history), HIV knowledge, as well as their personal beliefs. The responses were scaled as follows (1 = *yes*; 2 = *no*; 3 = *don't know*). A third-person-report strategy was employed, through the background variables, to maximise information on adolescent sexual behaviour. For example, items asked "Do you have friends your age who have had sex before?", "Do your friends who have sex use condoms?", "Do you know of a friend your age who ever got pregnant?" Other sample items included "Do you worry that you might get an HIV infection?", "Have you been personally diagnosed of STDs like syphilis or chlamydia or gonorrhoea before?", "Are people your age too young to get an HIV infection", "Do you know someone who died of AIDS?", "Will you be happy to take an HIV test to know your status?" These sociodemographic data are presented in Table 1.

Attitudes towards condom use. Twelve items were used to measure attitudinal beliefs about condom use. These items were taken from the 3-item subscale of the Sexual Risk Behaviour Beliefs and Self-efficacy (SRBBS) scales (Basen-Engquist et al., 1999; Cronbach's $\alpha = .87$) and the 9-item Sexual Cognitions subscale used in a previous research by Carmack and Lewis-Moss (2009; Cronbach's $\alpha = .90$). Aside from their robust reliabilities, these particular items were selected because

of their reported high factor loadings in previous research. Respondents were asked to indicate the extent to which they agreed or disagreed with each of the 12 statements on a 7-point unipolar scale that ranged from 1 (*strongly disagree*) to 7 (*strongly agree*). Sample items include "I believe condoms should always be used if a person my age has sex", "I am in favour of using condoms", "I believe condoms should always be used if a person my age has sex, even if the girl uses birth control pills", "The idea of using condoms appeals to me", and "I believe condoms should always be used if a person my age has sex, even if the two people know each other very well." Scale responses were scored such that higher scores indicated more favourable attitudinal beliefs about condom use.

Subjective norms regarding condom use. Subjective norms were assessed with eight items taken from previous research on condom use among adolescents. Three items were taken from Basen-Engquist et al. (1999) subscale of the Sexual Risk Behaviour Beliefs and Self-Efficacy Scales (SRBBS; Cronbach's $\alpha = .84$), three items were taken from Anderson et al. (2006; Cronbach's $\alpha = .82$), and a further two items were taken from DeHart and Birkimer (1997; Cronbach's $\alpha = .84$). Together, these items assessed descriptive normative influences on young people's condom use. Respondents were asked to indicate the extent to which they agreed or disagreed with each of the eight statements on a 7-point unipolar scale that ranged from 1 (*strongly disagree*) to 7 (*strongly agree*). Sample items include "Most of my friends believe condoms should always be used if a person my age has sex, even if the two people trust each other very well", Most of my friends believe condoms should always be used if a person my age has sex even if the girl uses birth control pills", "Most of my friends will say "no" to sex if a boyfriend or girlfriend won't use a condom", "Most of my close friends use condoms when they have sex with a boyfriend or girlfriend", and "If I had sex and I told my friends that I didn't use a condom, they would be disappointed." Scale responses were scored such that higher scores indicated greater perceived normative influence and motivation to comply with peer norms regarding condom use.

Perceived behavioural control over condom use. Ten items taken from previous research (Carmack & Lewis-Moss, 2009, Cronbach's α = .90; see also Jemmott III et al., 2007) were used to assess perceived behavioural control over condom use. The items assessed both perceived difficulty (the extent to which a person has access to the means of control) and perceived self-efficacy (situation-specific self-confidence) regarding condom use. The selected items specifically focused on two areas, namely assertiveness negotiation and skills relating to condom use. Respondents were required to indicate the extent to which they agreed or disagreed with each of the ten statements. Response anchors on a 7-point unipolar Likert scale ranged from 1 (*strongly disagree*) to 7 (*strongly agree*). Sample items include "I can use a condom correctly", "I can get my boyfriend or girlfriend to use a condom, even if he or she doesn't want to do so", "If I have a condom, my boyfriend or girlfriend would like it", and "I am sure that I can use a condom when I have sex." Scale responses were scored such that higher scores reflected a greater perceived efficacy or controllability over condom use.

Behavioural intentions towards future condom use. Intention to use condoms was assessed with eight items adapted from the Condom Use Intention subscale of the Sexual Risks Scale (SRS; DeHart & Birkimer, 1997, Cronbach's α = .76, for the subscale). These items assessed respondents' intention to use condoms over the coming three months. Respondents were asked to indicate the extent to which they agreed or disagreed with each of the eight statements provided on a 7-point unipolar Likert response scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The items were "It is very likely that I will use condoms if I have sex in the next 3 months", "I am determined to practise condom use in the next 3 months if I have sex", "I will make sure a condom is used when I have sex in the next 3 months", "I intend to follow condom use guidelines within the next 3 months", and "If I were going to have sexual intercourse in the next 3 months, I planned to use condoms." Scale responses were scored such that higher scores indicated more favourable intentions towards condom use over the next three months.

Self-reported condom use behaviour. Self-reported condom use over the past three months was assessed with ten items adapted from previous research (DiLorio, 2009, cited in Fisher, Davis, Yarber, & Davis, 2010; DiIorio, Parsons, Lehr, Adame, & Carlone, 1992; Holland & French, 2012; Walsh, Senn, Scott-Sheldon, Vanable, & Carey, 2011). Respondents were required to report their condom-protected sexual behaviour patterns by indicating how often they engaged in heterosexual sexual intercourse and how often they or their sexual partner used condoms in the course of these sexual acts. The response scale for this construct ranged from 1 (*never*) to 7 (*all the time*).

In adapting items for the condom use behaviour construct, efforts were made to avoid the limitations of previous studies that primarily used only one or two items to measure condom use behaviour, and thereby producing lack of construct reliability (see Sheeran, Abraham, & Orbell, 1999, for a meta-analysis on measures of condom use in 121 studies; see Noar, Cole, & Carlyle, 2006, for a systematic review of measures of condom use in 56 studies). Consequently, multiple items selected for inclusion in this study, sought to tap relevant aspects of condom use such as condom use frequency (e.g., How often have you had sex with your regular boyfriend/girlfriend with a condom in the past 3 months?"), condom non-use frequency (e.g., How often did you refuse to have sex with a partner because they would not use a condom in the past 3 months?"), condom communication (e.g., How often are you the person that has to suggest or insist on using a condom before sex in the past 3 months?"), and type of partners (i.e., condom use with both steady and casual sexual partners; e.g., "How often have you had sex with someone who is not your boyfriend/girlfriend (casual sex) with a condom in the past 3 months?"), with a primary focus on the frequency or consistency of actual condom use behaviour. Scale responses were coded such that higher scores indicated greater self-reported condom use behaviour over the past three months. The questionnaire was printed in a booklet format together with the self alpha-numeric identifier generation guide (see Appendix E).

Research Design

In this study I used a longitudinal design. There were three measurement occasions (i.e., Time 1, Time 2, and Time 3) with data collection spaced approximately three months apart (i.e., over nine months of data collection). I used a self-report survey data collection strategy. A report on the results obtained in the present study is presented next.

Chapter V

RESULTS

Introduction to this Chapter

In this chapter I provide a summary of the descriptive statistics of the matched sample, along with a summary of the preliminary and main data analyses. The main data analyses are organised into the following sections: cross-sectional structural analyses, and longitudinal analyses. I conclude the chapter with a summary of the key results.

Participant Characteristics

The results that are reported below relate to the 684 matched sample (n = 335 males; n = 349 females). The age range of these participants was between 14 and 20 years, the typical age range of high school students in Ghana. At Time 1, 11.7% of participants aged 14-15 years, 54.1% aged 16-17 years, and 34.2% aged 18-20 years completed the survey. Table 1 summarises participants' demographic information, as well as their responses to various questions relating to their sexual behaviour, beliefs, and knowledge (background characteristics).

As can be seen in Table 1, 30.8% (Time 1), 34.2% (Time 2), and 37.3% (Time 3) of male participants indicated that they had previously engaged in sexual intercourse, whereas the corresponding proportions among female participants were 26.5% (Time 1), 28.8% (Time 2), and 34.2% (Time 3). Furthermore, a large number of participants (49.3% at Time 1; 53.1% at Time 2; and 62.0% at Time 3) indicated that they had used condoms before. A significant proportion of participants at each time point (37.1% at Time 1; 32.3% at Time 2; and 38.7% at Time 3) indicated that they were concerned about contracting HIV.

Table 1

Demographic and Background Characteristics of the Sample Used in the Analyses

Characteristic		Time 1 (n = 684)		Time 2 (n = 684)		Time 3 (n = 684)	
		n	%	n	%	n	%
Age (years)							
14-15		80	11.7	80	11.7	80	11.7
16-17		370	54.1	370	54.1	370	54.1
18-20		234	34.2	234	34.2	234	34.2
Sex							
Male		335	49.0	335	49.0	335	49.0
Female		349	51.0	349	51.0	349	51.0
Student status							
Day		266	38.9	266	38.9	266	38.9
Boarding		418	61.1	418	61.1	418	61.1
As a boy, have you ever had sex with a girl?	Yes	211	30.8	234	34.2	255	37.3
As a girl, have you ever had sex with a boy?	Yes	181	26.5	197	28.8	234	34.2
Have you ever used a condom?*	Yes	337	49.3	363	53.1	424	62.0
Have you ever given or received money for having sex with someone?*	Yes	141	20.6	153	22.4	281	41.1
Have you been personally diagnosed of STDs like syphilis or gonorrhoea before?*	Yes	63	9.2	62	9.1	84	12.3
Are you currently using any birth control method?*	Yes	92	13.5	101	14.8	135	19.7
Do you worry that you might get an HIV infection?*	Yes	254	37.1	221	32.3	265	38.7
Will you be happy to take an HIV test to know your status?*	Yes	599	87.6	585	85.5	633	92.5
Do you know someone who is diagnosed of HIV or Aids?*	Yes	145	21.2	149	21.8	143	20.9
Do you know someone who died of HIV/Aids?*	Yes	215	31.4	202	29.5	242	35.4
Can a pregnant woman give HIV to her baby?*	Yes	537	78.5	538	78.7	606	88.6
Can a person have HIV and not show signs of any disease?*	Yes	337	49.3	383	56.0	458	67.0
Do you have friends your age who have had sex before?*	Yes	564	82.5	545	79.7	598	87.4
Do your friends who have sex use condoms?*	Yes	236	34.5	241	35.2	295	43.1
Do you know of a friend your age who ever got pregnant?*	Yes	552	80.7	525	76.8	532	77.8
Are people your age too young to get an HIV infection?*	Yes	176	25.7	188	27.5	189	27.6

Note. *Data are presented for male and female adolescent participants combined.

Whereas 87.6% (Time 1), 85.5% (Time 2), and 92.5% (Time 3) of participants indicated that they were interested in knowing their own HIV status, a substantial number of participants at each time point, believed that they were too young to acquire HIV (25.7% at Time 1; 27.5% at Time 2; and 27.6% at Time 3). As with most previous investigations of adolescent sexual behaviour, the majority of participants in this study (82.5% at Time 1; 79.7% at Time 2; and 87.4% at Time 3) believed that their friends were frequently engaging in sexual intercourse.

Preliminary Data Analyses

Preliminary data analyses on the five main theory of planned behaviour (TPB) components of interest (namely attitudes towards condom use, subjective norms about condom use, perceived behavioural control over condom use, intentions towards condom use, and condom use behaviour) were undertaken using the IBM SPSS statistics package (v20; Arbuckle, 2011). Frequencies were run to screen the data for entry errors and then, where necessary, items were reverse-scored such that higher scores on each construct reflected more favourable condom use attitudes, more positive perceived normative influence, greater perceived behavioural control, stronger intentions towards condom use, and more frequent condom use behaviour respectively.

Next, the data were assessed to determine the extent to which the primary assumptions necessary for parametric data analyses procedures were met by the data. The latent variable structural equation modelling procedures using M*plus* (v6.0; Muthén & Muthén, 1998-2011) described below were undertaken using a robust maximum likelihood estimator (MLR). MLR has been consistently shown to yield standard errors and a chi-square test statistic that are robust to deviations in both univariate and multivariate normality (Bentler & Bonett, 1980; Chou & Bentler, 1995; Curran, West, & Finch, 1996; West, Finch, & Curran, 1995).

Monte-Carlo simulation studies undertaken by West et al. (1995) showed that items with distribution values of skewness between -2.00 and +2.00 and kurtosis between -7.00 and +7.00 were capable of yielding sufficiently reliable parameter estimates when using MLR. The five TPB components under consideration showed acceptable values of both skewness and kurtosis. Descriptive statistics relating to the skewness and kurtosis values for each construct across all three waves of data collection are summarised in Table 2. Wave-by-wave analyses (i.e., Time 1, Time 2, and Time 3) revealed similar pattern of skewness and kurtosis values across the five TPB components.

Table 2

Minimum and Maximum Skewness and Kurtosis Values with Their Composite Means and Standard Deviations for Each of the Five TPB Constructs (N = 684)

	Skewness				Kurtosis			
Construct	Min	Max	*M*	*SD*	Min	Max	*M*	*SD*
Attitude	-1.94	-0.69	-1.55	0.41	-0.72	4.13	2.18	1.52
Subjective norm	-1.87	-0.99	-1.39	0.22	-0.10	4.23	1.40	0.95
Perceived control	-1.60	-0.37	-0.94	0.40	-1.15	2.42	0.09	1.09
Intention	-1.87	-0.62	-1.55	0.36	-0.87	4.12	2.24	1.21
Behaviour	-1.66	1.30	0.53	0.58	-1.33	0.69	-0.86	0.61

Note. Min = minimum value; Max = maximum value.

For each of the five TPB components, items that did not satisfy the skewness and kurtosis cut-off criteria stated above were eliminated across the three-time points (Time 1, Time 2, and Time 3). Four items with either skewness or kurtosis values outside of the range recommended by West et al. (1995) for attitudes towards condom use, one item each for subjective norms and behaviour, and two items for perceived behavioural control were eliminated from the main analyses on these grounds.

Establishing the unidimensionality of measurement and score reliability. Because of the complexities and difficulties that result from modelling with multi-dimensional items (i.e., an item that loads on two or more factors or an item whose error term seems to covary with that of another item),

various structural equation modelling researchers have cautioned against the unexamined use of multi-item constructs, where the unidimentionality of those constructs have not been adequately explored (e.g., Bandalos, 2008; Kline, 2011; Little, Cunningham, Shahar, & Widaman, 2002; Little, Lindenberger, & Nesselroade, 1999; Little, Preacher, Selig, & Card, 2007; Marsh, Lüdtke, Nagengast, Morin, 2013). Specifically, these researchers have advocated the use of unidimensional items or indicators (i.e., an item that loads on a single factor as well as an item whose error term does not covary with the error term of another item) to represent latent constructs because models comprising unidimensional items are thought to offer more accurate tests of discriminant and convergent validity than do models comprising multi-dimensional items.

Construct unidimensionality in this study was investigated using exploratory factor analysis (EFA) procedures. The special use of EFA in this study was, in many ways, similar to the use of confirmatory factor analysis (CFA) procedures because these EFA procedures were guided by theory (i.e., theory of planned behaviour). As a result, these EFA procedures could be said to be somewhat a priori hypothesis-driven. Maximum likelihood estimation (a default estimation technique in most structural equation modelling programmes) with direct oblimin rotation of correlated factors was used to establish construct unidimensionality instead of the traditional principal components analysis function of EFA. Closely associated with dimensionality of measurement are score reliability and score validity.

Score reliability coefficients are a necessity in social and behavioural science research and they are particularly warranted in psychological research. Unfortunately, research shows that poor measurement practices are widespread in quantitative research because many investigators rarely report reliability coefficients such as internal consistency reliability (i.e., coefficient alpha) or test-retest reliability for the scores relating to their samples (Thompson & Vacha-Haase, 2000; Vacha-Haase, Ness, Nilsson, & Reetz, 1999; Vacha-Haase & Thompson, 2011). These researchers instead provide

only descriptions of reliability coefficients from either test manuals or from previous studies (Vacha-Haase, Kogan, & Thompson, 2000; Vacha-Haase, Nilsson, Reetz, Lance, & Thompson, 2000), as though the characteristics of their samples are similar to those of previous studies. Kline (2011) described this reporting practice as *reliability induction*:

> Too many authors who invoke reliability induction (inferring from particular coefficients calculated in other samples to a different population) fail to explicitly compare characteristics of their sample with those from cited studies….That is, if researchers believe that reliability, once established, is an immutable property of the test, then they may put little effort into estimating score reliability in their own samples. (p. 69)

Viewed from this perspective, reliability induction appears problematic because a data point in a research project primarily comes from an individual's score on a defined variable within time (e.g., Time 1) and space (e.g., Ghana). Thus, it does not seem difficult to understand why it is inappropriate to infer reliability coefficients in one study to another. In finding an explanation as to why many researchers engage in this poor reporting practices, Thompson and Vacha-Haase (2000) surmised that it was possible many researchers believed that reliability coefficients are rather associated with *tests* instead of *scores* relating to a defined sample in a research project. On the basis of this research, Kline (2011) recommended that "whenever possible—and it usually is, especially for internal consistency reliability—report score reliability coefficients in your own samples" (p. 70).

Correspondingly, the use of confirmatory factor analysis procedures to estimate score reliability coefficients has been shown to bias reliability estimates (see Yang & Green, 2010, for a Monte Carlo simulation study). Arguably, the use of coefficient alpha to estimate reliability appears much simpler (Streiner, 2003) compared with the CFA procedures outlined by Bentler (2009) and by Raykov and

Shrout (2002). Coefficient alpha (i.e., Cronbach's alpha) is also the most commonly used technique in social and behavioural research to establish score reliability (Kline, 2011; Leech, Onwuegbuzie, & O'Conner, 2011). Given the afore-mentioned considerations, efforts were made in this study to use exploratory factor analysis (EFA) procedures to establish construct dimensionality in order to pave the way for the establishment of score reliability coefficients for the present sample, notwithstanding the fact that the majority of the measures used in this study had been selected from previous research.

Consequently, following the screening of the data relative to skewness and kurtosis assumptions, I carried out exploratory factor analyses (EFA), using a maximum likelihood (ML) estimator and direct oblimin rotation, to determine the dimensionality of measurement of each of the five TPB components at each time point. Data were screened for potential multicollinearity among the individual items (indicated by inter-item correlations greater than or equal to Pearson's $r = .90$; Field, 2009). There were no indications of multicollinearity in the data. The minimum factor loading cut-off that was used to assess the strength with which an item loaded onto a given factor was set at ($r \geq .40$; Field, 2009).

Deletion of scale items. Items that were found to be poor indicators of any of the five theory of planned behaviour constructs (i.e., attitudes, subjective norms, perceived behavioural control, behavioural intentions, and overt behaviour) relative to the above-mentioned inclusion criteria (i.e., individual items indicated by inter-item correlations (Pearson's $r \leq .90$) and individual items with minimum factor loading (Pearson's $r \geq .40$) were eliminated across all three time points (i.e., Time 1, Time 2, and Time 3). For example, if an item was found to be a poor indicator of, say, attitudes towards condom use at Time 1, that item was eliminated not only at Time 1, but also it was eliminated at Time 2 and Time 3 in order to ensure that latent constructs were measured by the same underlying items across all the three waves of measurement. This kind of dimensionality of measurement (i.e., establishing measurement dimensionality across time) is a prerequisite for undertaking longitudinal data analyses using latent variable structural equation modelling. Importantly, for each TPB construct,

after the deletion of a poor scale item(s), the exploratory factor analysis was re-run to confirm factor loading and unidimensionality of measurement.

Related to this, recall that (as stated in earlier sections of this chapter) for each of the five theory of palnned behaviour constructs items that did not satisfy skewness and kurtosis cut-off criteria as per West et al.'s (1995) acceptable distribution values of skewness ($-2.00 \leq x \geq +2.00$) and acceptable distribution values of kurtosis ($-7.00 \leq x \geq +7.00$), were eliminated across the three time points (i.e., Time 1, Time 2, and Time 3). These cut-off criteria, West et al., (1995) argued, provide more accurate parameter estimates when the estimation technique employed in the structural equation modeling is robust maximum likelihood (MLR) estimation.

Consequently, I deleted 21 items from the original 48-item survey questionnaire across the five TPB components. For example, four items that failed to satisfy either the skewness or the kurtosis cut-off criteria for attitudes towards condom use, one item each for subjective norms regarding condom use and self-reported condom use behaviour, and two items for perceived behavioural control over condom use were eliminated from the analyses. The other deleted items either demonstrated poor factor loading relative to the set loading criteria used in this study, or they exhibited poor within-construct inter-item correlations. For example, some negatively-worded items such as item 4 and item 8 of the attitude scale, when reverse-scored, correlated highly with one another, but poorly with other items in the same scale.

A total of 27 items across the five theory of planned behaviour constructs, which demonstrated satisfactory factor loadings ($\geq .40$), produced adequate within-construct inter-item correlations, and served as unidimensional items of their respective construct (i.e., an item that loads on a single factor as well as an item whose error term does not covary with the error term of another item), satisfied the inclusion criteria and were thus retained in the analyses. The unidimensional scales reflecting each of the five theory of planned behaviour constructs at each time point were: attitudes towards condom use

(5 items; i.e., items 1,2,3,5, and 7; see items with asterisks in the attitude scale in Appendix F), subjective norms regarding condom use (5 items; i.e., items 3,4,5,6, and 7; see items with asterisks in the subjective norm scale in Appendix F), perceived behavioural control over condom use (4 items; i.e., items 1,7,8, and 9; see items with asterisks in the perceived behavioural control scale in Appendix F), intentions to use condoms (6 items; i.e., items 2,4,5,6,7, and 8; see items with asterisks in the intention scale in Appendix F), and self-reported condom use behaviour (7 items; i.e., items 1,3,5,7,8,9, and 10; see items with asterisks in the self-reported condom use scale in Appendix F). Efforts were made to ensure that the five theory of planned behaviour components comprised identical items at each time point (i.e., Time 1, Time 2, and Time 3) in preparation for the longitudinal analyses that were to follow. The percentage of common variance explained across time by the retained items for each of the five TPB components under investigation is presented in Table 3.

Table 3

Percentage of Common Variance Explained by Items of Each Latent Variable Across Time

		% of common variance explained		
Construct	Number of items	Time 1	Time 2	Time 3
Attitude	5	28.09%	31.20%	32.45%
Subjective norm	5	24.57%	28.03%	33.06%
Perceived control	4	35.37%	33.90%	44.48%
Intention	6	38.21%	39.88%	47.65%
Behaviour	7	51.62%	57.41%	53.34%

Note. $N = 684$.

Following the completion of these exploratory factor analyses, I determined the internal consistency reliability of each multi-item construct at each time point by calculating coefficient alpha (i.e., Cronbach's alpha). Mean-score composite measures were created for each construct at each time point by calculating an average score across the construct's items. The composite means (*M*), standard deviations (*SD*), and reliability (Cronbach's α) are summarised in Table 4.

Table 4

Psychometric Properties of the Composite Measures at Times 1, 2, and 3 (N = 684)

	Time 1			Time 2			Time 3		
Composite measure	*M*	*SD*	α	*M*	*SD*	α	*M*	*SD*	α
Attitude (5-items)	5.64	0.06	.64	5.72	0.13	.66	5.97	0.15	.69
Subjective norm (5-items)	5.55	0.04	.62	5.66	0.15	.66	5.82	0.03	.71
Perceived control (4-items)	5.25	0.9	.67	5.43	0.23	.66	5.66	0.14	.75
Intention (6-items)	5.59	0.19	.78	5.74	0.18	.78	5.85	0.13	.84
Behaviour (7-items)	2.91	0.14	.88	3.06	0.19	.90	3.33	0.15	.89

Note. The response scale for "attitude", "subjective norm", "perceived behavioural control", and intention ranged from 1 (*strongly disagree*) to 7 (*strongly agree*), whereas that of "behaviour" ranged from 1 (*never*) to 7 (*all the time*). Higher means reflect more favourable dispositions.

In the final step before undertaking the latent variable structural equation modelling, I reduced the number of indicators for some of the constructs at each time point, using item-parcelling (Little, Cunningham, Shahar, & Widaman, 2002; Little, Lindenberger, & Nesselroade, 1999; Little, Rhemtulla, Gibson, & Schoemann, 2013; Rushton, Brainerd, & Pressley, 1983). Item-parcelling was undertaken using the item-to-construct balancing approach (Alhija & Wisenbaker, 2006; Little et al., 2002). Item-parcelling provides an appropriate means of reducing the overall number of indicators for a given latent variable, which minimises the impact of measurement error on the estimation of the parameter estimates (Little et al., 2002). Several authors recommended that three or four indicators per latent construct were optimal for latent variable structural equation analyses (Schreiber, 2008; Streiner, 2006; Weston & Gore, 2006).

In this study, item-parcelling was only necessary for four of the five TPB components, which were measured with more than four items (namely attitudes, subjective norms, behavioural intentions, and behaviour). The four items used to measure perceived behavioural control served as item-level indicators for this construct at each time point. An important consideration when undertaking latent variable longitudinal SEM is that all item- and parcel-level indicators for a given construct should be

identical at each time point (Little et al., 2002). In accordance with this requirement, parcel-level indicators were created such that they were identical for a given construct across all three waves of data.

Tables 5, 6, and 7 report the bivariate correlations between the item parcels (latent variable indicators) at each time point. Significant positive relationships between the indicators within a given latent variable suggest adequate communality between those indicators. A closer inspection of the respective intra-construct intercorrelations at each time point shows that each construct exhibited robust intra-construct correlations (see highlighted portions in the correlation matrices) between its indicators, suggesting independence between the constructs at each time point. However, this would need to be further investigated via a confirmatory factor analysis at each time point (as described in more detail below).

Main Analyses

Gender comparisons. One of the goals of this study was to examine gender differences (male versus female students) in negotiating condom use relative to the standard components of the theory of planned behaviour (TPB). In accordance with this goal, it was predicted that there would be a significant difference between male students and female students in negotiating condom use relative to the components of the TPB. To examine this prediction, one-way multivariate analysis of variance (MANOVA) tests were conducted with the TPB components and gender at each time point. TPB components were entered into the equation as dependent variables and gender was entered as an independent variable (fixed factor). Results revealed statistically significant differences by gender on the composite dependent variable—overall multivariate effect at Time 1, F (5, 678) = 9.75, $p < .001$; Wilks' $\lambda = .93$; partial $\eta^2 = .067$); Time 2, F (5, 677) = 9.08, $p < .001$; Wilks' $\lambda = .94$; partial $\eta^2 = .063$); and Time 3, F (5, 676) = 8.37, $p < .001$; Wilks' $\lambda = .94$; partial $\eta^2 = .058$).

Table 5

Bivariate Correlations Among Latent Variable Indicators at Time 1

Indicator	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. A_1	-																
2. A_2	.52***	-															
3. A_3	.31***	.33***	-														
4. SN_1	.17***	.21***	.34***	-													
5. SN_2	.23***	.26***	.18***	.41***	-												
6. SN_3	.16***	.16***	.09*	.35***	.24***	-											
7. PBC_1	.27***	.21***	.12**	.23***	.23***	.23***	-										
8. PBC_2	.34***	.32***	.21***	.21***	.22***	.20***	.43***	-									
9. PBC_3	.28***	.23***	.14***	.21***	.18***	.21***	.41***	.38***	-								
10. PBC_4	.19***	.18***	.09*	.15***	.02	.15***	.26***	.34***	.24***	-							
11. I_1	.28***	.34***	.24***	.21***	.12**	.22***	.31***	.36***	.33***	.30***	-						
12. I_2	.35***	.42***	.32***	.32***	.26***	.21***	.39***	.42***	.34***	.25***	.58***	-					
13. I_3	.25***	.32***	.24***	.23***	.19***	.19***	.32***	.33***	.29***	.19***	.56***	.58***	-				
14. B_1	.16***	.14***	.02	.09*	.04	.09*	.09**	.17***	.13***	.21***	.17***	.15***	.13***	-			
15. B_2	.19***	.18***	.08	.11**	.06	.10**	.13**	.18***	.15***	.24***	.22***	.19***	.17***	.73***	-		
16. B_3	.19***	.21***	.10**	.08*	.04	.07	.11**	.20***	.16***	.23***	.19***	.17***	.14***	.74***	.76***	-	
17. B_4	.10**	.11**	.01	.09**	.11**	.10**	.08*	.17***	.16***	.17***	.09**	.10**	.05	.56***	.59***	.54***	-

Note. A_{1-3} = indicators for the latent variable "attitudes towards condom use"; SN_{1-3} = indicators for the latent variable "subjective norm regarding condom use"; PBC_{1-4} = indicators for the latent variable "perceived behavioural control over condom use"; I_{1-3} = indicators for the latent variable "intention towards future condom use"; and B_{1-4} = indicators for the latent variable "self-reported condom use behaviour".
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 6

Bivariate Correlations Among Latent Variable Indicators at Time 2

Indicator	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. A_1	-																
2. A_2	.52***	-															
3. A_3	.34***	.39***	-														
4. SN_1	.17***	.22***	.33***	-													
5. SN_2	.24***	.31***	.28***	.46***	-												
6. SN_3	.21***	.22***	.23***	.39***	.30***	-											
7. PBC_1	.24***	.24***	.16***	.25***	.29***	.23***	-										
8. PBC_2	.27***	.29***	.18***	.23***	.28***	.20***	.42***	-									
9. PBC_3	.23***	.25***	.21***	.30***	.33***	.17***	.39***	.31***	-								
10. PBC_4	.30***	.25***	.10**	.14***	.12**	.19***	.28***	.34***	.26***	-							
11. I_1	.35***	.29***	.28***	.26***	.28***	.31***	.33***	.28***	.31***	.28***	-						
12. I_2	.30***	.27***	.29***	.31***	.34***	.26***	.36***	.33***	.35***	.29***	.62***	-					
13. I_3	.28***	.27***	.22***	.21***	.28***	.22***	.35***	.34***	.22***	.20***	.54***	.55***	-				
14. B_1	.18***	.13***	.06	.10**	.04	.13***	.11**	.14***	.16***	.24***	.16***	.17***	.11**	-			
15. B_2	.24***	.15***	.09*	.11**	.07	.15***	.12**	.16***	.15***	.25***	.18***	.19***	.11**	.80***	-		
16. B_3	.22***	.17***	.06	.08*	.03	.16***	.13**	.17***	.17***	.30***	.19***	.19***	.14***	.79***	.76***	-	
17. B_4	.17***	.15***	.06	.07	.10**	.15***	.10**	.15***	.09*	.15***	.15***	.17***	.12**	.68***	.68***	.67***	-

Note. A_{1-3} = indicators for the latent variable "attitudes towards condom use"; SN_{1-3} = indicators for the latent variable "subjective norm regarding condom use"; PBC_{1-4} = indicators for the latent variable "perceived behavioural control over condom use"; I_{1-3} = indicators for the latent variable "intention towards future condom use"; and B_{1-4} = indicators for the latent variable "self-reported condom use behaviour".
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 7

Bivariate Correlations Among Latent Variable Indicators at Time 3

Indicator	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. A_1	-																
2. A_2	.57***	-															
3. A_3	.38***	.45***	-														
4. SN_1	.31***	.32***	.33***	-													
5. SN_2	.28***	.31***	.25***	.49***	-												
6. SN_3	.29***	.33***	.24***	.39***	.40***	-											
7. PBC_1	.33***	.37***	.28***	.30***	.35***	.29***	-										
8. PBC_2	.35***	.34***	.22***	.25***	.27***	.24***	.54***	-									
9. PBC_3	.26***	.33***	.30***	.34***	.35***	.22***	.53***	.47***	-								
10. PBC_4	.38***	.34***	.24***	.20***	.15***	.27***	.34***	.37***	.32***	-							
11. I_1	.34***	.37***	.28***	.29***	.32***	.33***	.42***	.44***	.33***	.31***	-						
12. I_2	.37***	.37***	.33***	.28***	.34***	.31***	.41***	.47***	.40***	.37***	.68***	-					
13. I_3	.40***	.42***	.30***	.31***	.34***	.35***	.48***	.50***	.40***	.36***	.68***	.67***	-				
14. B_1	.14***	.11**	.05	.09*	.09*	.09*	.13***	.12**	.17***	.20***	.18***	.18***	.10**	-			
15. B_2	.15***	.14***	.08*	.10**	.10**	.12**	.17***	.17***	.20***	.21***	.21***	.23***	.16**	.76***	-		
16. B_3	.13***	.14***	.06	.07	.05	.07*	.12**	.14***	.16***	.25***	.19***	.19***	.12**	.75***	.75***	-	
17. B_4	.15***	.15***	.09*	.13***	.15***	.12**	.15***	.15***	.19***	.16**	.19***	.22***	.15**	.59***	.64***	.61***	-

Note. A_{1-3} = indicators for the latent variable "attitudes towards condom use"; SN_{1-3} = indicators for the latent variable "subjective norm regarding condom use"; PBC_{1-4} = indicators for the latent variable "perceived behavioural control over condom use"; I_{1-3} = indicators for the latent variable "intention towards future condom use"; and B_{1-4} = indicators for the latent variable "self-reported condom use behaviour".
* $p < .05$. ** $p < .01$. *** $p < .001$.

To assess the statistical significance of the TPB components (dependent variables) separately across time, a Bonferroni adjusted alpha level of ($p < .01$) was used. The univariate results revealed statistically significant differences by gender in perceived behavioural control and condom use behaviour at Time 1 (see Table 8). Also, there were statistically significant gender differences in attitudes, perceived behavioural control, and actual behaviour relative to condom use at Time 2 (see Table 9) and Time 3 (see Table 10).

Table 8

Univariate Mean Differences by Gender in Latent Variables at Time 1

	Time 1								
	Male		Female						
Variable	*M*	*SD*	*M*	*SD*	*F*	*df*1	*df*2	*P*	Partial η^2
Attitude	5.74	1.05	5.55	1.16	5.21	1	682	.023	.008
Norm	5.46	1.13	5.65	0.99	5.94	1	682	.015	.009
Control	5.41	1.29	5.09	1.38	9.52	1	682	.002	.014
Intention	5.69	1.11	5.49	1.21	5.10	1	682	.024	.007
Behaviour	3.21	1.76	2.57	1.57	25.26	1	682	<.001	.036

Note. *df*1 = degree of freedom; *df*2 = error.

Table 9

Univariate Mean Differences by Gender in Latent Variables at Time 2

	Time 2								
	Male		Female						
Variable	*M*	*SD*	*M*	*SD*	*F*	*df*1	*df2*	*P*	Partial η^2
Attitude	5.81	1.07	5.58	1.11	7.61	1	681	.006	.011
Norm	5.67	1.02	5.73	1.05	0.50	1	681	.479	.001
Control	5.60	1.14	5.26	1.29	13.24	1	681	<.001	.019
Intention	5.83	1.00	5.65	1.13	5.09	1	681	.024	.007
Behaviour	3.42	1.81	2.68	1.70	29.75	1	681	<.001	.042

Note. *df*1 = degree of freedom; *df*2 = error.

Table 10

Univariate Mean Differences by Gender in Latent Variables at Time 3

	Time 3								
	Male		Female						
Variable	*M*	*SD*	*M*	*SD*	*F*	*df*1	*df2*	*p*	Partial η^2
Attitude	6.03	0.85	5.86	0.95	6.60	1	680	.010	.010
Norm	5.83	0.87	5.81	0.94	0.08	1	680	.775	.000
Control	5.79	1.05	5.54	1.14	8.83	1	680	.003	.013
Intention	5.94	0.90	5.77	1.08	5.03	1	680	.025	.007
Behaviour	3.69	1.53	2.99	1.54	35.36	1	680	<.001	.049

Note. *df*1 = degree of freedom; *df*2 = error.

Cross-sectional and longitudinal structural equation modelling. The primary aim of the present study was to undertake a test of the full longitudinal mediation processes described in the classic theory of planned behaviour (TBP) model. However, prior to testing the longitudinal structural hypotheses of the present study, it was considered necessary to first examine the cross-sectional mediation hypotheses that are commonplace in the TPB literature, at each of the three time points of data collection (see Figure 4). The objective of these three cross-sectional analyses was to try and replicate mediation processes reported in the existing cross-sectional TPB literature, in a novel African student population (Ghana).

Statistical mediation is said to exist when an independent variable affects a dependent variable indirectly through one or more intervening variables, known as mediators (Cole & Maxwell, 2003; Preacher & Hayes, 2008; Rucker et al., 2011). Mediation hypotheses are important because they enable researchers to go beyond establishing relationships (correlations) between variables, to the explanation of causal processes (MacKinnon & Lueken, 2008). Nevertheless, survey data (and especially cross-sectional data) do not allow researchers to undertake strict causal tests — only experiments, where third variable effects can be controlled for, would allow for such strict causal tests. However, such mediation

models allow researchers to explore the underlying causality implied by a theory to determine how well the theoretical model (with the implied causal relationships) fits the data.

Latent variable structural equation modelling (SEM), using the M*plus* (v6.0; Muthén & Muthén, 1998-2010) statistical package was used to undertake these cross-sectional and longitudinal mediation analyses. Across all SEM analyses, parameter estimates were calculated using robust maximum likelihood (MLR) estimation. As noted in earlier sections of this Chapter, MLR adjusts for correct standard errors in cases of non-normality. Generally, maximum likelihood estimators are known to possess the asymptotic characteristics necessary to produce unbiased and consistent parameter estimates (Bentler & Bonett, 1980; Chou & Bentler, 1995; Curran et al., 1996; West et al., 1995). In these analyses, missing data were handled throughout using full information maximum likelihood (FIML) estimation. The percentage of cases with some missing data points was 0.15% at Time 1, 0.58% at Time 2, and 1.46% at Time 3. Prior research has shown that when data are missing at random (as it is the case in this study), the FIML provides unbiased parameter estimates (Arbuckle, 1996; Enders, 2001).

To estimate indirect effects in simple mediation designs (such as the mediation processes postulated by the TPB), Preacher and Hayes (2004; 2008) recommended the use of bootstrapping. The bootstrapping technique involves treating the original sample of size *N* as if it were the empirical population. The analyst then takes a large number of *k* subsamples (where *k* is, at least, 1000) from this original sample (*N*) with replacement in order to estimate the indirect effect relative to each resampled data (Hayes, 2009; Preacher & Hayes, 2004; 2008). It is assumed that an empirical approximation of the sampling distribution of the indirect effect would be achieved (had the sample of size *N* been actually obtained from the original population), when this resampling process is repeated a total of *k* times.

Three considerations motivated the use of bootstrapping in these cross-sectional analyses. First, bootstrapping, a non-parametric effect-size estimation technique, facilitates a formal significance testing of the indirect effects in mediation models due to its ability to provide bias-corrected confidence intervals (see Preacher & Hayes, 2004; 2008). Second, the bootstrapping technique does not make any assumptions about the shape of the sampling distribution or the distribution of variables (Efron & Tibshirani, 1993). Finally, bootstrapping is not sensitive to sample size. Bootstrapping, therefore, allows for the generation of more accurate parameter estimates and confidence intervals when testing indirect effects (Preacher & Hayes, 2004; 2008).

The two-step approach to undertaking structural equation modelling proposed by Anderson and Gerbing (1988; see also Swart, Hewstone, Christ, & Voci, 2010; Swart et al., 2011) was followed in carrying out the analyses described below. In the first step, the measurement model was fit to the data to determine whether the latent variables identified by their respective indicators sufficiently represented the patterns of covariance observed in the data. In the second step, the structural model specifying the relationships between the latent variables was fit to the data.

As per Anderson and Gerbing's (1988) recommendations, each step of the modelling process requires the interpretation of various indices of model fit, known as goodness-of-fit indices, to determine the extent to which the measurement and structural models fit the data. For this study, the model fit indices included in the analyses were the following: the chi-square test statistic (χ^2) with degrees of freedom, the relative χ^2 (i.e., chi-square per degree of freedom, or χ^2/df), the comparative fit index (CFI; Bentler, 1990), the root mean square error of approximation (RMSEA; Steiger & Lind, 1980), and the standardised root mean square residual (SRMR). Hu and Bentler's (1999) recommended cutoff criteria for acceptable fit between the data and the model include a non-significant ($p > .05$) chi-square, CFI $\geq .90$ (Schumacker & Lomax, 1996, cited in Schermelleh-Engel, Moosbrugger, & Muller, 2003), an RMSEA value $< .08$ (Browne & Cudeck, 1993), and an SRMR value $< .08$ (Hu & Bentler,

1999). Models are adjudged to have good fit if they possess these cutoff criteria: relative or normed χ^2 statistic < 3:0 (Kline, 2004, cited in Iacobucci, 2010; see also Hooper, Coughlan, & Mullen, 2008; Stank, Goldsby, Vickery, & Savitskie, 2003; Tabachnick & Fidell, 2007; Ullman, 2001), CFI ≥ .95; RMSEA < .07; and SRMR < .05 (Byrne, 1998; Hu & Bentler, 1999; Kline, 2011; Steiger, 2007).

Cross-sectional test of the theory of planned behaviour. The theory of planned behaviour model was tested cross-sectionally for each of the three waves of data collection. This was done using the data from the 684 respondents that had completed the survey at all three time points. In the first step of Anderson and Gerbing's (1988) two-step approach, a confirmatory factor analysis (CFA) was performed to test the goodness-of-fit of the cross-sectional measurement model at each of the three waves of data collection, employing a robust maximum likelihood estimation technique (MLR; Muthén & Muthén, 1998-2010). The measurement model describes the relationships between the items or indicators (e.g., the attitudes towards condom use scale) and the latent constructs (e.g., attitudes) these items or indicators are thought to measure (Weston & Gore, 2006).

Put differently, the measurement model enables the modeller to examine how well his or her items or indicators combine linearly to describe the underlying latent constructs he or she has hypothesised to cause them. Confirmatory factor analysis (CFA), a special structural equation modelling technique, procedures facilitate the testing of the measurement model. If the CFA analysis produces a poor model-data fit, it will suggest that there is model misspecification. That is, the relationships the researcher has hypothesied to exist between his or her observed variables and the latent variables may have been misjudged. In contrast, if the CFA analysis produces a good model-data fit, then there is measurement adequacy (unidimensionality of measurement), suggesting that the model has been appropriately specified. In this study, the model fit for each of the three cross-sectional measurement models is summarised in Table 11.

Table 11

Goodness-of-Fit Statistics of the Cross-Sectional Measurement Models at Time 1, Time 2, and Time 3

Model (Time)	Number of indicators	χ^2	*df*	*p*	χ^2/df	CFI	RMSEA	90% CI RMSEA *LL*	90% CI RMSEA *UL*	SRMR
$CFA_{(T1)}$	17	191.21	109	<.001	1.75	.973	.033	.03	.04	.036
$CFA_{(T2)}$	17	208.96	109	<.001	1.92	.971	.037	.03	.04	.039
$CFA_{(T3)}$	17	108.59	109	<.001	1.66	.981	.031	.02	.04	.034

Note. CFA = confirmatory factor analysis. Subscripts T1, T2, and T3 indicate Time 1, Time 2, and Time 3. CFI = comparative fit index; RMSEA = root mean square error of approximation; CI = confidence interval; *LL* = lower limit; *UL* = upper limit; SRMR = standardised root mean residual.

As can be seen in Table 11, results showed that overall the measurement model provided a very good fit to the data across time. The factor loadings of the indicators on their respective latent variables were all statistically significant at ($p < .001$), suggesting that all the indicators adequately represented their respective latent construct. In all three measurement models, the chi-square statistic was significant ($p < .001$). Although a good model fit is indicated by a non-significant chi-square statistic ($p > .05$), as discussed earlier, the chi-square statistic is, however, sensitive to sample size and to model complexity (Bearden, Sharma, & Teel, 1982; Cheung & Rensvold, 2002; Hu & Bentler, 1999; Marsh, Hau, & Wen, 2004; Meade, Johnson, & Braddy, 2008). Other researchers have also argued that the model chi-square test's emphasis on exact model-data fit constitutes a limitation, as the achievement of a perfect model-data fit in structural equation modelling is considered to be a remote possibility (Miles & Shevlin, 2007; Steiger, 2007), hence the popular emphasis on approximate model-data fit (Marsh, Hau, & Wen, 2004; McDonald & Ho, 2002; Ullman, 2006a; Ullman, 2006b).

Consequently, some research has noted that in instances of model complexity and of large sample sizes, it is meaningful to interpret a relative or normed chi-square statistic instead (Hooper, Coughlan, & Mullen, 2008; Iacobucci, 2010; Schumacker & Lomax, 2004, Tabachnick, & Fidell,

2007; Ullman, 2001; Wheaton, Muthén, Alwin, & Summers, 1977). The relative chi-square or normed chi-square statistic (i.e., χ^2/df) calculates a chi-square value per degree of freedom, overcoming the problems associated with fitting complex models as well as fitting models with large samples (Artino, La Rochelle, & Durning, 2010; Fischer & Smith, 2008; Stank et al., 2003). As can be seen in Table 11, the relative or normed χ^2 values are below the cut-off criterion of relative or normed χ^2 statistic < 3:0 (Kline, 2004, cited in Iacobucci, 2010; see also Hooper et al., 2008; Stank et al., 2003; Tabachnick & Fidell, 2007; Ullman, 2001) suggested to be indicative of acceptable model fit.

In the second step of Anderson and Gerbing's (1988) two-step approach, the goodness-of-fit of the cross-sectional structural model described by the TPB was tested separately at each wave of data collection (Time 1, Time 2, and Time 3). The latent variable structural model that was fit to the data at each time point is illustrated in Figure 5.

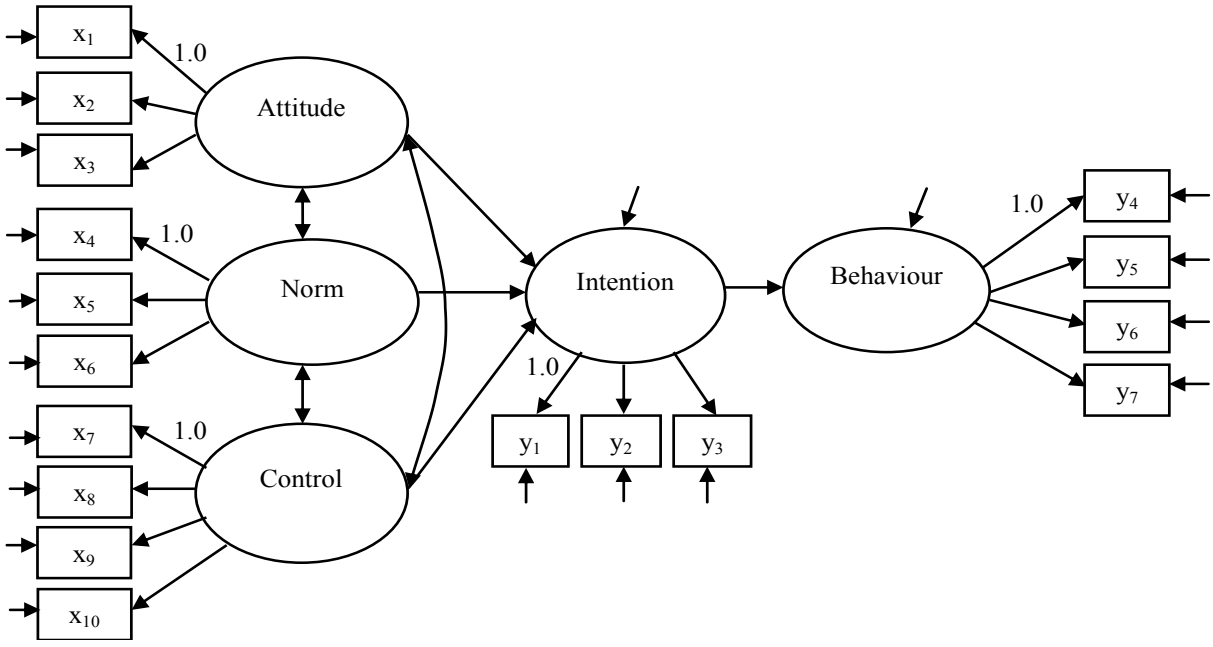

Figure 5. The full cross-sectional mediation model estimated at Time 1, Time 2, and Time 3. Rectangles represent indicators; ovals represent latent variables. Unidirectional arrows represent structural parameters (paths). Bidirectional arrows represent correlations.

Given the underlying mediation assumptions of the structural model described in Figure 5 (where behavioural intention is the proposed mediating variable), the parameter estimates for the structural relationships between the five TPB components were estimated with 1000 bootstrap resamples (Hayes, 2009; Preacher & Hayes, 2004, 2008), using maximum likelihood (ML) estimation (MLR is unavailable for bootstrapping in M*plus*). Moreover, since M*plus* yields bias-corrected confidence intervals relative to unstandardised effects (Hayes, 2009; Preacher & Hayes, 2008; Selig & Preacher, 2009), unstandardised coefficients for the structural relationships are reported throughout for the structural models.

Time 1 cross-sectional structural model. The cross-sectional structural model at Time 1 showed good model fit, χ^2 (112, N = 684) = 241.12, p < .001, χ^2/df = 2.15, CFI = .967, RMSEA = .041; 90% CI [.034, .048], SRMR = .041, and it is illustrated in Figure 6. Attitudes towards condom use (b = .38; 95% CI [.14, .62], p < .01) and perceived behavioural control over condom use (b = .47; 95% CI [.31, .63], p < .001) were both significantly positively associated with the intentions to use condoms. Intentions to use condoms were, in turn, significantly positively associated with self-reported condom use (b = .41; 95% CI [.28, .55], p < .001). The indirect relationships between attitudes towards condom use (b = .16; 95% CI [.04, .27], p <. 01) and perceived behavioural control over condom use (b = .20; 95% CI [.11, .28], p < .001) and behaviour were significantly mediated by intentions to use condoms. In the only departure from the traditional theory of planned behaviour model (and as often reported in the TPB literature), subjective norms regarding condom use were not statistically significantly associated with the intentions to use condoms (b = .06; 95% CI [-.14, .26], p = .593). The cross-sectional structural model at Time 1 explained 61% of the variance in intentions to use condoms and 8% of the variance in self-reported condom use.

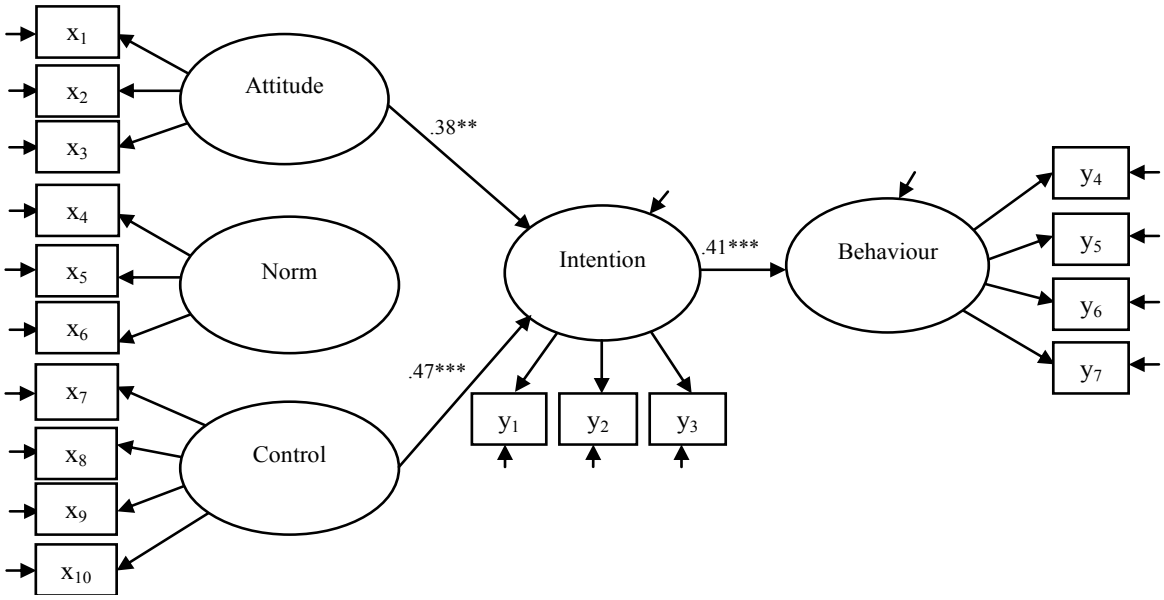

Figure 6. Cross-sectional structural equation model of the effects of attitude towards condom use and perceived behavioural control over condom use on self-reported condom use, depicting mediation via intention to use condoms for high school students at Time 1. Unstandardised coefficients are reported for only significant paths.

Model fit: χ^2 (112, N = 684) = 241.12, p < .001, χ^2/df = 2.15, comparative fit index = .967, root mean square error of approximation = .041, 90% CI [.034, .048], standardised root mean square residual = .041. The correlations between the predictor variables were as follows: attitude with subjective norm, r = .40***; attitude with perceived behavioural control, r = .61***; and subjective norm with perceived behavioural control, r = .55***.
** p < .01. *** p < .001.

Time 2 cross-sectional structural model. The cross-sectional model at Time 2 provided an adequate fit to the data, χ^2 (112, N = 684) = 263.04, p < .001, χ^2/df = 2.34, CFI = .965, RMSEA = .044; 90% CI [.037, .048], SRMR = .046, and it is illustrated in Figure 7. Attitudes towards condom use (b = .20; 95% CI [.01, .39], p < .05) and perceived behavioural control over condom use (b = .46; 95% CI [.24, .68], p < .001) were both significantly positively associated with the intentions to use condoms. Intentions to use condoms were then significantly positively associated with self-reported condom use (b = .44; 95% CI [.30, .58], p < .001).

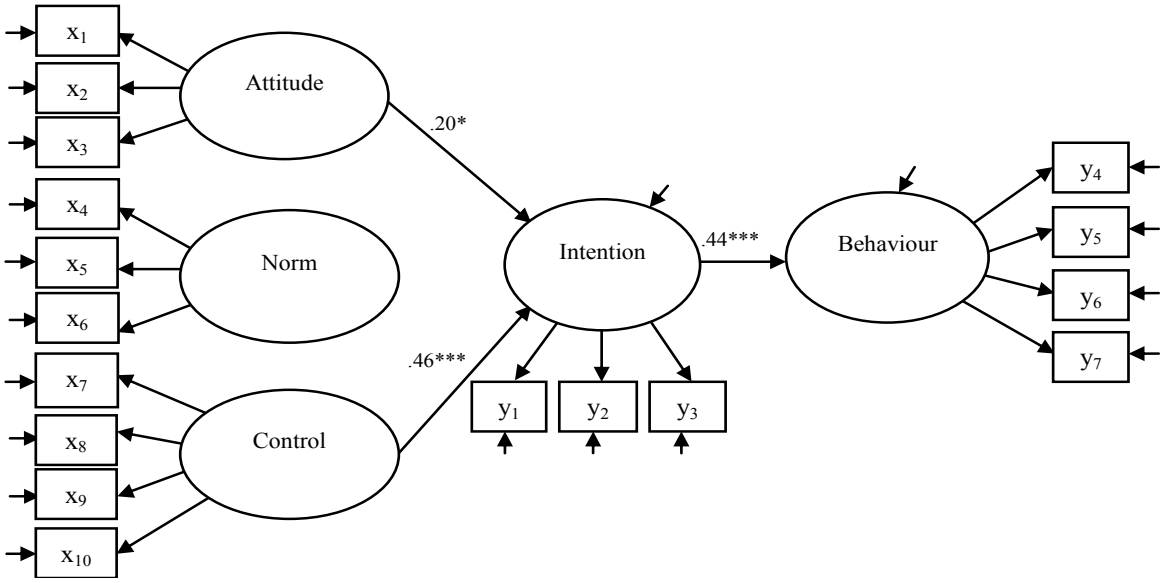

Figure 7. Cross-sectional structural equation model of the effects of attitude towards condom use and perceived behavioural control over condom use on self-reported condom use, depicting mediation via intention to use condoms among high school students at Time 2. Unstandardised coefficients are reported for only significant paths.

Model fit: χ^2 (112, N = 684) = 263.04, p < .001, χ^2/df = 2.34, comparative fit index = .965, root mean square error of approximation = .044, 90% CI [.037, .048], standardised root mean square residual = .046. The correlations between the predictor variables are as follows: attitude with subjective norm, r = .42***; attitude with perceived behavioural control, r = .59***; and subjective norm with perceived behavioural control, r = .57***.
* p < .05. *** p < .001.

Furthermore, the indirect relationships between attitudes towards condom use (b = .09; 95% CI [-.00, .18], p = .052) and perceived behavioural control over condom use (b = .20; 95% CI [.09, .31], p < .001) and condom use behaviour were significantly mediated by intentions to use condoms. Evidently, subjective norms regarding condom use were not statistically significantly associated with the intentions to use condoms (b = .21; 95% CI [-.05, .47], p = .111). The cross-sectional structural model at Time 2 accounted for 54% of the variance in intentions to use condoms and 7% of the variance in self-reported condom use.

Time 3 cross-sectional structural model. The cross-sectional model at Time 3 demonstrated acceptable model fit indices, χ^2 (112, N = 684) = 228.14, p < .001, χ^2/df = 2.04, CFI = .977, RMSEA = .039; 90% CI [.032, .046], SRMR = .038, and it is illustrated in Figure 8. Whereas perceived

behavioural control over condom use was significantly positively associated with the intentions to use condoms (b = .52; 95% CI [.29, .74], p < .001), the relationship between attitudes towards condom use and intentions to use condoms approached statistical significance (b = .22; 95% CI [-.01, .45], p = .064). Intentions to use condoms significantly positively predicted self-reported condom use (b = .40; 95% CI [.30, .51], p < .001). In addition, the indirect relationship between perceived behavioural control over condom use and self-reported condom use, was significantly mediated by intentions to use condoms (b = .21; 95% CI [.10, .32], p <. 001).

Notwithstanding the fact that attitudes towards condom use approached only statistical significance directly, the indirect relationship between attitudes towards condom use and self-reported condom use, through the mediation of behavioural intentions, approached statistical significance (b = .09; 95% CI [-.01, .18], p = .067). Consistent with the results reported for subjective norms at Time 1 and Time 2, subjective norms regarding condom use once again did not directly significantly predict intentions to use condoms (b = .13; 95% CI [-.09, .35], p = .240). The cross-sectional structural model at Time 3 accounted for 61% of the variance in intentions to use condoms and 7% of the variance in self-reported condom use.

Longitudinal test of the theory of planned behaviour. Although the cross-sectional results reported above showed relatively good support for the theory of planned behaviour, the cross-sectional data did not make it possible to test the temporal relationships implied by the theory of planned behaviour model. To this end, I analysed the three waves of data simultaneously in a longitudinal model. The primary objective of the longitudinal analyses was to determine whether attitudes towards condom use, subjective norms regarding condom use, and perceived behavioural control over condom use behaviour at Time 1 would predict intentions to use condoms reported at Time 2, and whether such intentions would, in turn, predict self-reported condom use behaviour at Time 3 (as predicted by the theory of planned behaviour).

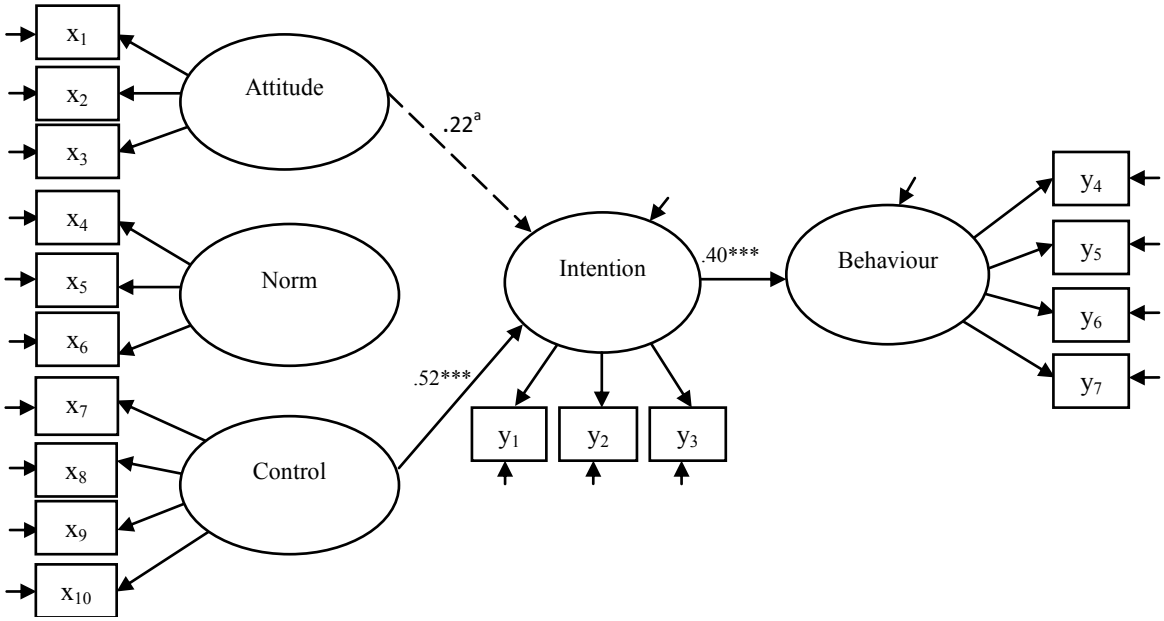

Figure 8. Cross-sectional structural equation model of the effects of attitude towards condom use and perceived behavioural control over condom use on self-reported condom use, depicting mediation via intention to use condoms for high school students at Time 3. Unstandardised coefficients are reported for only significant paths.

Model fit: χ^2 (112, N = 684) = 228.14, p < .001, χ^2/df = 2.04, comparative fit index = .977, root mean square error of approximation = .039, 90% CI [.032, .046], standardised root mean square residual = .041. The correlations between the predictor variables are as follows: attitude with subjective norm, r = .40***; attitude with perceived behavioural control, r = .53***; and subjective norm with perceived behavioural control, r = .52***.

[a] p = .064. *** p < .001.

Additionally, such longitudinal analyses offer a stricter test of the theory of planned behaviour because each between-construct relationship over time is tested having controlled for the within-construct (autoregressive) relationships over time. As with the cross-sectional structural analyses, I implemented Anderson and Gerbing's (1988) two-step approach to structural equation modelling to these longitudinal analyses.

In the first step, the longitudinal measurement model (including all observed and latent variables at each time point) was fit to the data via a longitudinal confirmatory factor analysis (CFA; Little, Preacher, Selig, & Card, 2007). The longitudinal CFA model evaluates whether the latent constructs

(e.g., attitudes, subjective norms, perceived behavioural control, behavioural intentions, and self-reported behaviour) hypothesised by the researcher have been measured equivalently across the measurement occasions (e.g., Time 1, Time 2, and Time 3). Also, the longitudinal CFA model enables the researcher to examine if the relations among the latent constructs across time and within time are stable over time or whether they are undergoing systematic changes over time (Little et al., 2007; Ullman, 2006). Therefore, if the longitudinal CFA model demonstrates that there is adequacy of measurement across time then it suggests that the hypothesised structural relationships among the latent constructs may be tested, using structural equation modelling. Following from this, in this study, the initial longitudinal measurement model was fit without any parameter constraints. This freely estimated longitudinal measurement model (N = 684 matched participants) showed good model fit, χ^2 (1102) = 1850.95, p <.001; χ^2/df =1.68; CFI = .949; RMSEA = .032, 90% CI [.029, .034]; SRMR = .040.

An important consideration in the analysis of longitudinal data is that of measurement invariance (also known as factorial invariance). Establishing measurement invariance over time is important as it serves to confirm that the measurement model is equivalent across all waves of data collection. The need to satisfy measurement invariance assumptions becomes necessary when a study involves multiple indicators of a latent construct that is measured over time (Meredith, 1993; Meredith & Teresi, 2006; Widaman, Ferrer, & Conger, 2010). Longitudinal analyses are considered appropriate only when the longitudinal model exhibits, at least, factorial measurement invariance – when the relations between latent constructs (factors) and their observed indicators remain invariant across time (Meredith & Teresi, 2006; Widaman et al., 2010). To evaluate factorial invariance within the context of this longitudinal structural equation model, invariance constraints were imposed across time by constraining the factor loadings for respective observed variables/item parcels of a given construct to equality over time. This constrained longitudinal factorial invariance model showed a good fit to the

data, χ^2 (1126) = 1850.95, $p < .001$, $\chi^2/df = 1.67$, CFI = .949, RMSEA, = .031; 90% CI [.029, .034], SRMR = .042.

Next, I compared the model fit of this stricter (constrained) longitudinal model (specifying factorial invariance) with that of the baseline (freely estimated) longitudinal model, using the Satorra-Bentler scaled chi-square difference test (Bryant & Satorra, 2012; Satorra & Bentler, 2001). This test compares the change in chi-square between the two models relative to the change in degrees of freedom. The comparison revealed that, although specifying more constraints (i.e., being a statistically more demanding model), the factorial invariance longitudinal CFA model did not differ significantly from the freely estimated longitudinal CFA model, $\Delta\chi^2(24) = 21.75$, $p > .05$, confirming that imposing equality constraints on the factor loadings yielded a more parsimonious measurement model that did not lead to significantly worse model fit. Having successfully established partial measurement invariance (which is the minimum pre-requisite for undertaking further longitudinal analyses; Meredith & Teresi, 2006), I moved on to the second step of the Anderson and Gerbing's (1988) two-step approach and began fitting longitudinal structural models to the data.

Using the better-fitting longitudinal measurement model (with partial measurement invariance) as the starting point, I fitted a series of longitudinal structural models to the data. The fitted longitudinal models addressed questions of direct effects that included autoregressive and cross-lagged effects (see longitudinal hypothesised structural model in Figure 2). Specifically, based on the results of several meta-analyses, systematic reviews, and empirical cross-sectional studies of the theory of planned behaviour, I made the following predictions (see the bold paths in Figure 2): (a) attitudes towards condom use, subjective norms regarding condom use, and perceived behavioural control regarding condom use at Time 1 will be significantly positively associated with increased intentions towards condom use at Time 2, even after controlling for the effects of the intentions towards condom use at Time 1; (b) intentions towards condom use at Time 2 will be significantly positively associated with

increased condom use behaviour at Time 3, even after controlling for the effects of self-reported condom use behaviour at Time 2; and (c) intentions towards condom use at Time 2 will significantly, and fully, mediate the relationship between attitudes, subjective norms, and perceived behavioural control at Time 1 and self-reported condom use behaviour at Time 3.

Consequently, I ran a series of longitudinal structural models and then I used the Satorra-Bentler scaled χ^2-difference test (Satorra & Bentler, 2001) to conduct model comparisons (similar to the strategy adopted when comparing alternative, nested measurement models). Throughout this modelling process, no suggested model modifications were carried out because the suggestions were theoretically not plausible.

Autoregressive longitudinal model. Longitudinal autoregressive statistical models suggest that, assuming sufficient construct stability over time, a measure of a given construct taken at time *t* will significantly predict scores on that same measure taken again at a future time, $t + 1$. An important assumption of causal modelling is that the longitudinal autoregressive statistical model must demonstrate stationarity (Cole & Maxwell, 2003; Kenny, 1979; Marsh, 1993; Maxwell & Cole, 2007). Kenny (1979) described stationarity as a causal structure that rarely changes, or which is stable over time. In other words, stationarity reflects causal relations between one set of variables and another set of variables that do not change over time. In plain language, autoregressive stationarity holds that the observed patterns or sizes of correlations among measures of the same construct (e.g., attitudes towards condom use) obtained across time (i.e., Time 1, Time 2, Time 3, etc.) should not change but should rather remain stationary. Autoregressive stationarity is tenable in the present study given the equidistant time lags between Time 1 and Time 2 and between Time 2 and Time 3 measurements (Cole & Maxwell, 2003). To test for underlying autoregressive longitudinal stationarity, I compared a series of nested autoregressive models to one another.

First, a freely estimated (baseline) autoregressive model (where the within-construct autoregressive relationships were freely estimated over time) was fit to the data. This baseline (freely estimated) autoregressive model produced acceptable model fit, χ^2 (1191) = 1989.53, $p < .001$, χ^2/df = 1.67, CFI = .946, RMSEA = .031; 90% CI [.029, .034], SRMR = .055. As can be seen from the model fit statistics, the relative or normed χ^2 statistic (i.e., 1.67) is below the cut-off criterion of values < 3:0 (Kline, 2004, cited in Iacobucci, 2010; see also Hooper et al., 2008; Stank et al., 2003; Tabachnick & Fidell, 2007; Ullman, 2001), that have been shown to indicate good model fit. Next, to assess the extent of autoregressive stationarity among the theory of planned behaviour components over time, a series of increasingly restrictive autoregressive models were fit to the data (see Table 12). These models set various equality constraints on the within-construct relationships over time. The best fitting autoregressive model (see Figure 9) exhibited partial stationarity and showed acceptable model fit, χ^2 (1195) = 1996.59, $p < .001$, χ^2/df = 1.67, CFI = .945, RMSEA = .031; 90% CI [.029, .034], SRMR = .053.

In this best-fitting autoregressive model, the within-construct relationships between attitudes and subjective norms were constrained to equality with one another over time, whereas the within-construct autoregressive relationship of behaviour was constrained to equality over time. The within-construct autoregressive relationships of perceived behavioural control and intentions were freely estimated over time. This is because acceptable model fit could not be achieved by imposing within-construct equality constraints on perceived behavioural control and intentions over time. As a result, the autoregressive relationships between perceived behavioural control and intentions were, therefore, freely estimated over time, explaining why they did not demonstrate uniform autoregressive effects over time in the structural model (see Figure 9). As indicated in Table 12, the Satorra-Bentler scaled χ^2-difference test confirmed that the model fit of this more parsimonious, best-fitting autoregressive model did not differ significantly from that of the freely estimated autoregressive model.

Table 12

Comparison Between Autoregressive and Cross-Lagged Longitudinal Models

Model	Model fit	Model Comparisons	Corrected chi-square difference test
1a	$\chi^2(1191) = 1989.53$***; CFI =.95; RMSEA =.031; SRMR =.055		
1b	$\chi^2(1196) = 2018.34$***; CFI =.94; RMSEA =.032; SRMR =.053	1b vs. 1a	$\Delta\chi^2(5) = 18.20$**
1c	$\chi^2(1195) = 2007.52$***; CFI =.95; RMSEA =.032; SRMR =.053	1c vs. 1a	$\Delta\chi^2(4) = 10.57$*
1d	$\chi^2(1194) = 1997.44$***; CFI =.95; RMSEA =.031; SRMR =.053	1d vs. 1a	$\Delta\chi^2(3) = 7.16^{ns}$
1e	$\chi^2(1195) = 1996.59$***; CFI =.95; RMSEA =.031; SRMR =.053	1e vs. 1d	$\Delta\chi^2(1) = .37^{ns}$
2a	$\chi^2(1187) = 1977.00$***; CFI =.95; RMSEA =.031; SRMR =.050		
2b	$\chi^2(1191) = 1985.45$***; CFI =.95; RMSEA =.031; SRMR =.051	2b vs. 2a 2b vs 1e	$\Delta\chi^2(4) = 6.04^{ns}$ $\Delta\chi^2(4) = 10.04$*

Note. CFI= comparative fit index; RMSEA = root mean square error of approximation; SRMR = standardised root mean square residual. 1a = autoregressive model (freely estimated theory of planned behaviour (TPB) model relationships); 1b = autoregressive model (within-construct equality constraints for all five TPB components); 1c = autoregressive model (within-construct equality constraints for attitude, subjective norm, intention, and behaviour with perceived behavioural control freely estimated); 1d = autoregressive model (within-construct equality constraints for attitude, subjective norm, and behaviour with intention and perceived control freely estimated); 1e = autoregressive model (within-construct equality constraints for behaviour, with between-construct equality constraints for attitude and subjective norm, and intention and perceived control freely estimated). 2a = cross-lagged structural model (all five TPB components freely estimated); 2b = cross-lagged structural model (within-construct equality constraints for all five TPB components).

[a]How to determine which comparison model describes the data well: (a) when you compare two versions of a model with one being less restrictive (has no equality constraints, freely estimated) and the other being more restrictive (has equality constraints) from the same category (e.g., autoregressive models), the more restrictive model should yield a nonsignificant *p*-value ($p > .05$) for the model fit to be considered acceptable, and (b) when you compare two models from two different categories (e.g., autoregressive model versus cross-lagged structural model), the model that improves model fit ($p < .05$) is the one to be accepted.

* $p < .05$. ** $p < .01$. *** $p < .001$; *ns* = nonsignificant; all relative χ^2 indices < 3:0; $N = 684$.

As you can see in Figure 9, the best autoregressive longitudinal model showed considerable autoregressive stability over time overall. Specifically, the model demonstrated autoregressive stability in attitudes towards condom use, subjective norms regarding condom use, and self-reported condom use behaviour over time. Note, however, that the autoregressive relationships for perceived behavioural control over condom use and intentions to use condom were not stable over time, with stronger Time 2 to Time 3 autoregressive correlations than Time 1 to Time 2 autoregressive correlations (see Figure 9).

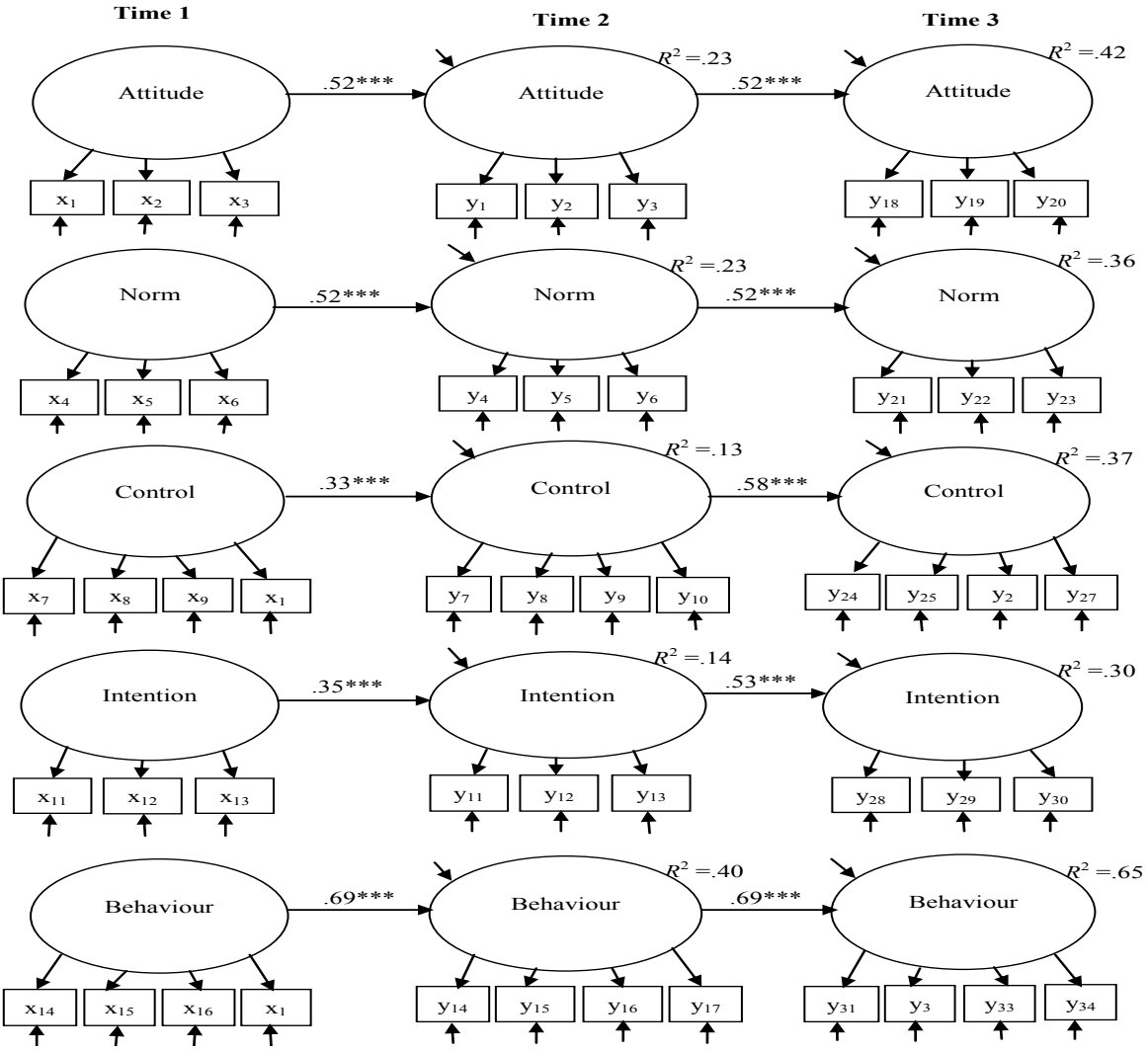

Figure 9. Longitudinal autoregressive model (best) of theory of planned behaviour components with unstandardised longitudinal parameter estimates and explained variance.

Model fit: χ^2 (1195) = 1996.59, p < .001, χ^2/df = 1.67, comparative fit index = .945, root mean square error of approximation = .031; 90% CI, [.029, .034], standardised root mean square residual = .053. To achieve clarity of presentation, within-wave correlations among the error terms, disturbance terms, and within-wave between-construct correlations are not shown.
*** p < .001; N = 684

Cross-lagged longitudinal model. The cross-lagged structural paths that constitute the longitudinal hypotheses of the present study (see Figure 2) were added to the best autoregressive longitudinal model illustrated in Figure 9. These cross-lagged structural paths test whether, beyond the within-construct autoregressive effect that a construct has on itself over time, there also exist between-construct (cross-lagged) relationships among latent variables over time. For example, in this study,

attitudes towards condom use at Time 1 were expected to predict condom use intentions at Time 2 (three months after Time 1), after controlling for the effects of condom use intentions at Time 1, and condom use intentions at Time 2, in turn, were expected to predict self-reported condom use behaviour at Time 3 (three months after Time 2), after controlling for the effects of self-reported condom use behaviour at Time 2.

To test for longitudinal cross-lagged effects, I first fitted a freely estimated cross-lagged longitudinal model to the data. This freely estimated cross-lagged longitudinal model demonstrated adequate fit to the data, χ^2 (1187) = 1977.00, $p < .001$, $\chi^2/df = 1.67$, CFI = .946, RMSEA = .031; 90%CI [.029, .034], SRMR = .050. As can be seen from the model fit indices, the relative χ^2 statistic (i.e., 1.67) is lower than the recommended cut-off threshold of relative χ^2 statistic < 3:0 (Kline, 2004, cited in Iacobucci, 2010; see also Hooper et al., 2008; Stank et al., 2003; Tabachnick & Fidell, 2007; Ullman, 2001), indicating that this model described the data well. Next, to establish parsimony and cross-lagged stationarity (Kenny, 1979), all cross-lagged structural paths in the longitudinal model were constrained to between-construct equality across time. The longitudinal cross-lagged model with these added constraints described the data well, χ^2 (1191) = 1985.45, $p < .001$, $\chi^2/df = 1.67$, CFI = .946, RMSEA = .031; 90% CI [.029, .034], SRMR = 0.051.

Compared with the freely estimated longitudinal structural model, the Satorra-Bentler scaled χ^2-difference test revealed that the more restrictive (demanding) longitudinal model (i.e., with added constraints) did not differ significantly from the freely estimated model, $\Delta\chi^2(4) = 6.04$, $p > .05$ (see Table 12 [2b vs. 2a]). Furthermore, a comparison between this best cross-lagged longitudinal model and the best autoregressive longitudinal model using the Satorra-Bentler scaled χ^2 -difference test revealed that the best cross-lagged longitudinal model fitted the data significantly better than did the best autoregressive longitudinal model, $\Delta\chi^2(4) = 10.04$, $p < .05$ (see Table 12 [2b vs. 1e]).

The results of the best cross-lagged longitudinal model suggest that the hypothesised longitudinal structural relationships between the theory of planned behaviour components, in this study, achieved limited support (see Figure 10). To optimise clarity of presentation, statistically significant cross-lagged paths in the hypothesised longitudinal structural model are indicated by straight lines and nonsignificant paths are indicated by broken lines in Figure 10. Specifically, the path from attitudes towards condom use at Time 1 to intentions to use condoms at Time 2 was statistically significant (b = .11, p < .05), even after controlling for prior effects of intentions to use condoms at Time 1.

On the contrary, the specific path from subjective norms regarding condom use at Time 1 to intentions to use condoms at Time 2 was not statistically significant (b = .06, p = .261). Similarly, the specific path from perceived behavioural control over condom use Time 1 to intentions to use condoms at Time 2 did not reach statistical significance (b = -.03, p = .537), at least, after controlling for prior levels of intentions to use condoms at Time 1. Note, also, that the path from intentions towards condom use at Time 2 to self-reported condom use behaviour at Time 3 was statistically nonsignificant (b = .04, p = .318), at least, after controlling for prior levels of self-reported condom use behaviour at Time 2. On the basis of these results, the longitudinal mediation prediction made in the current study was not supported.

Despite the limited support for the longitudinal relationships postulated by the theory of planned behaviour in the current study, it is important to note, however, that this cross-lagged longitudinal model accounted for a substantial portion of the variance in attitudes towards condom use (Time 2: R^2 = 24%, Time 3: R^2 = 44%), subjective norms regarding condom use (Time 2: R^2 = 24%, Time 3: R^2 = 38%), perceived behavioural control over condom use (Time 2: R^2 = 13%, Time 3: R^2 = 38%), intentions to use condoms (Time 2: R^2 = 15%, Time 3: R^2 = 31%), and self-reported condom use behaviour (Time 2: R^2 = 40%, Time 3: R^2 = 65%) over time. For this study, these explained variances

were acceptable because they derived from the adequate construct stationarity achieved in the autoregressive longitudinal model (see Figure 9).

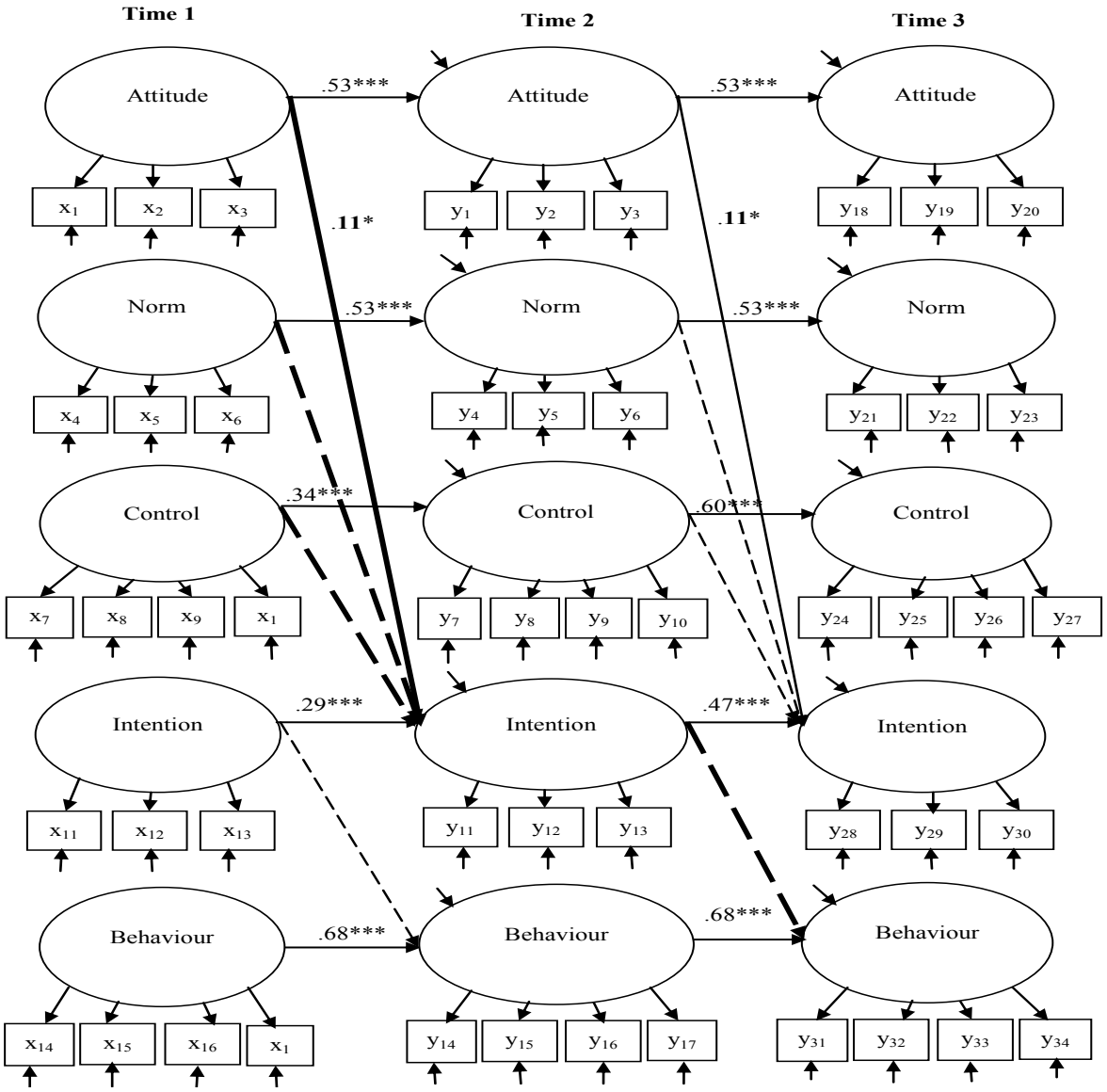

Figure 10. Cross-lagged longitudinal model showing structural paths with main longitudinal hypotheses depicted by bold downwardly sloped paths between theory of planned behaviour's constituent components across time. Statistically significant structural paths are indicated by straight lines and nonsignificant paths are indicated by broken lines. Unstandardised parameter estimates are reported.

Model fit: χ^2 (1191) = 1985.45, p < .001, χ^2/df = 1.67, comparative fit index = .946, root mean square error of approximation = .031; 90% CI [.029, .034], standardised root mean square residual = .051.

* p < .05. *** p < .001; N = 684

Summary of Findings

The current research used the theory of planned behaviour (TPB) framework to assess intentions to use condoms and self-reported condom use behaviour in a sample of senior high school heterosexual students drawn from eastern Ghana. Latent variable structural equation modelling was used to examine the predictive efficacy of the TPB-based hypothesised longitudinal model. Overall, consistent with the theory of planned behaviour, attitudes towards condom use at Time 1 were longitudinally associated with intentions to use condoms three months later at Time 2, and attitudes towards condom use at Time 2 were longitudinally associated with intentions to use condoms another three months later at Time 3. The longitudinal pathways between subjective norms and perceived behavioural control each, on the one hand, and behavioural intentions, on the other hand, were not supported. In addition, intentions to use condoms did not demonstrate statistically significant longitudinal effects on self-reported condom use behaviour over time, contrary to the prediction of the TPB. In sum, this study obtained only limited support for the longitudinal relationships postulated by the theory of planned behaviour. In the Chapter that follows I provide a discussion of the implications of the main outcomes in this study.

Chapter VI

DISCUSSION

Introduction to this Chapter

This chapter recaps the primary goal of this study and presents the main outcomes relative to the hypotheses examined. To evaluate and interpret the implications of the main outcomes in relation to the hypotheses, the discussion is organised into sections. Then I examine the results in more detail and draw inferences from them to form conclusions vis-à-vis the extant literature. Practical and theoretical implications are highlighted. Finally, I note the limitations of this study and then suggest future research pathways.

Main Research Outcomes

In this study, I tested the theory of planned behaviour's (TPB) efficacy to explain sexually active heterosexual senior high school students' intentions to use condoms and self-reported condom use behaviour over time, using latent variable structural equation modelling. Overall, the results of the analyses demonstrated only limited support for the postulated longitudinal relationships of the TPB's components. Specifically, the results showed that of the TPB's standard components, only attitude predicted senior high school students' intentions to use condoms over time. No support was found for the longitudinal relationship between subjective norms and intentions to use condoms, on the one hand, and between perceived behavioural control and intentions to use condoms, on the other hand. Contrary to my hypothesis, intentions to use condoms did not predict condom use behaviour over time in the present study. Despite this limited support for the TPB, the findings generally serve to shape our understanding of adolescent sexual behaviour in this novel African setting and to provide us with important insights to guide the design of sex education programmes.

The important new finding in this study is that attitude appears to be the strongest longitudinal predictor of intentions to use condoms, for in-school adolescents. This finding is consistent with a systematic review among African adolescents that found attitudes to be a more reliable predictor of condom use intentions, and behavioural intentions to be a poor predictor of actual behaviour (Paul-Ebhohimhen, Poobalan, & van Teijlingen, 2008).

To my knowledge, as far as the TPB sexual behaviour literature is concerned, this is the first research to examine the longitudinal association between the TPB's components with three waves of data, using latent variable structural equation modelling. Consequently, the current investigation advances the TPB research literature by offering different methodological approaches for testing this classic and most cited theoretical model. Thus, the finding relative to attitude strength would contribute significantly to our current knowledge of the attitude-intention correspondence. Put another way, this finding serves to clarify the role of the attitude-intention causal link and to help shape the debate that the attitude-intention correspondence has sparked in the social psychology literature (see Bentler & Speckart, 1981; Eagly & Chaiken, 1993; LaPiere, 1934; Liska, Felson, Chamlin, & Baccaglini, 1984; Wicker, 1969; for reviews) .

Pathway Between Attitude and Intention

This study confirmed a statistically significant longitudinal association between attitude and intention. This finding indicates that the pathway from attitude to intention is a fairly robust and stable one. This result is consistent with a recent two-wave panel study in sub-Saharan Africa that found attitudes to be the strongest predictor of intention to use condoms of young people (Molla et al., 2007). A previous meta-analysis revealed that attitude was an important predictor of intention to use condoms (Albbarracin et al, 2001). Similarly, my results are consistent with findings from other previous longitudinal studies using structural equation modelling with high school adolescents (Beadnell et al., 2007). In Beadnell et al.'s (2007) study, attitudes, subjective norms, and self-efficacy significantly

predicted intentions to have sex. The current findings regarding subjective norms and perceived behavioural control contrast with those of Beadnell et al. (2007). The differences in these results may reflect a methodological difference between their research and the present study. This is because Beadnell et al.'s (2007) research was a two-wave panel study with data collection spaced one year apart, predicting the intention to have sex, compared to the present study using three waves of data collection spaced three months apart, predicting the intentions to use condoms. Also, Beadnell et al. (2007) measured intentions to have sex only at Time 1 but not at Time 2, using a half-longitudinal design (Cole & Maxwell, 2003), as compared to the present study that employed a full longitudinal design.

The current finding regarding attitude-intention correspondence compared favourably with those reported in a longitudinal investigation by Morrison, Baker, and Gillmore (1998) and Reinecke et al. (1996), using the theory of planned behaviour (TPB) framework. Contrary to the present finding, Morrison et al. (1998) and Reinecke et al. (1996) found a significant association between subjective norms and intentions, and between intentions and condom use behaviour. Despite the notable similarities between this study and those of Morrison et al. (1998) and Reinecke et al. (1996), there exist crucial differences. For example, Morrison et al. (1998) tested condom use in a sample of teenagers attending sexually transmitted disease (STD) clinics (a high-risk group), and Reinecke et al.'s (1996) two-wave panel study involved a sample drawn from out-of-school adolescents and young adults and with a one-year interval between measurement occasions. Moreover, Morrison et al. (1998) used multiple regression analysis techniques with two waves of data. They also did not measure all TPB components at both waves of data collection (contrary to the present study). These empirical differences between the current study and those of Morrison et al. (1998) and Reinecke et al. (1996) may reveal methodological artefacts responsible for the conflicting results. It is important to note that

the present study is, arguably, characterised by greater methodological and statistical rigour than either of these two previous longitudinal studies.

Furthermore, although cross-sectional evidence exists supporting the attitude-intention correspondence, the current longitudinal analysis extends these findings by highlighting the importance of attitude formation and activation for school-aged adolescents, regarding sexual behaviour. The statistically significant longitudinal association between attitudes and intentions obtained in this study may be applicable to sex education programmes in senior high schools in eastern Ghana. From the current results, it seems clear that these information-only programmes are effectively shaping the sexual health knowledge of in-school adolescents. This knowledge, in turn, appears to be having a positive influence on attitudes towards condom use, which may impact on the intentions to use condoms over time.

The potential influence of information-based sexual risk prevention on young people's sexual attitudes and behaviour was evident in this study. Table 1 (descriptive data on students' background sexual history, sexual knowledge, and beliefs) revealed a general increasing trend in participants' health-protective behaviour across time. For example, an increasing number of participants (49.3% at Time 1, 53.1% at Time 2, and 62.0% at Time 3) reported that they had previously used condoms, while 87.6% (Time 1), 85.5% (Time 2), and 92.5% (Time 3) of participants revealed that they were interested in knowing their HIV status via voluntary counselling and testing. These findings appear crucial because the adolescent stage of development is susceptible to many sources of attitude formation (i.e., friends, sex partners, parents, teachers, and significant others). Actual human behaviour is also thought to be a function of attitudinal evaluation (Ajzen & Fishbein, 2000; Friedkin, 2010). Research shows that sound adolescent health is an important predictor of good later adult health (Sawyer et al., 2012).

Pathway Between Subjective Norm and Intention

Contrary to the TPB's prediction, results of the present study did not confirm the longitudinal relationship between subjective norms and intentions. This finding is comparable to that of earlier research (Basen-Engquist & Parcel, 1992), but contrasts with previous research in Ghana among university students, that reported subjective norms to be the most important predictor of condom use intentions (Bosompra, 2001). However, Bosompra's research used a cross-sectional design and a multiple regression technique.

Similarly, the present results contrast with other previous longitudinal research that reported subjective norms as the strongest predictor of condom use intentions among young people in Ethiopia (Molla et al., 2007). These differences in results between the current study and that of Molla et al. (2007) may be due to differences in study design and analytic strategy. Molla et al. (2007) used two-waves of data and did not measure all the theory of planned behaviour constructs at both measurement occasions (i.e., their research design was not as rigorous and demanding as that of the present study). Moreover, they employed a multiple regression analysis to test the longitudinal relationships between the constructs.

However, these conflicting results are not unexpected because findings from prior research on the subjective norm-intention association are mixed. For example, whereas Giles et al. (2005) found subjective norms to be the most important predictor of condom use intentions among Zulu adolescents in South Africa (see also Fekadu & Kraft, 2001; Sacolo et al., 2013), Jemmott III et al. (2007) noted that subjective norms were not a significant predictor of South African Xhosa-speaking in-school adolescents' intentions to use condoms. Consistent with the current study, Jemmott III and colleagues (2007) found attitudes (alongside perceived behavioural control) to be the most influential determinants of condom use intentions among Xhosa adolescents.

In the present study, items measuring the subjective norm construct focused on descriptive norms, specifically peer norms (what friends say and do) and not on injunctive norms (what significant others expect the adolescent to do, the infractions of which attract punishment). It is possible that descriptive peer norms are not salient for condom use intentions and behaviour for the current sample (i.e., senior high school students in Ghana), even though a number of studies have found peer norms to significantly influence adolescent sexual behaviour (e.g., Benda & DiBlasio, 1994; Berenson, Wu, Breitkopf, & Newman, 2006; Bleakley, Hennessy, Fishbein, & Jordon, 2009; Brown, 2004; Busse, Fishbein, Bleakley, & Hennessy, 2010; DiClemente, 1991; Kim, Gebremariam, Iwashyna, Dalton, & Lee, 2011; Mrug, Borch, & Cillessen, 2011; Sieving, Eisenberg, Pettingell, & Skay, 2006).

Consistent with existing literature, the measures used in the present study were more general. Whereas this generality may facilitate and offer opportunities to universalise sexual behaviour research (in line with the goals of psychological science), the potential lack of contextual specificity may have decreased the relative weights of postulated TPB model relationships. It is unclear if a statistically significant association between subjective norms and intentions would have emerged had an elicitation study been carried out to identify prevailing normative influences on youth sexual behaviour. Although the current study did not conduct an elicitation study to inform a population-specific questionnaire, scale items on the general measures elicited individual specific sexual experiences and were thus not expected to impact the results greatly.

Another possible explanation for the lack of association between subjective norms and intentions may be that the salience of normative influence on condom use intentions and behaviour was not considered relevant in this novel, African context (Ghana) because adolescent sexual behaviour is associated with social stigma and sexual stereotype (Riley & Baah-Odoom, 2010). That is, parents, teachers, religious leaders, and significant others actively discourage adolescents from engaging in premarital sexual intercourse, in line with prevailing socio-cultural norms and religious teaching.

Consequently, parental-adolescent sexual communication rarely occurs. Given this background, in-school adolescents in eastern Ghana suffer social stigma in their bid to access condoms, even from health professionals. For the most part, these unfavourable adult attitudes towards adolescent sexual behaviour may explain why, despite the ongoing condom promotion in Ghana, young people are rarely considered a target group of interest. Additionally, this situation may explain, in part, why condoms are not freely available for students on senior high school and university campuses in Ghana.

Biddlecom, Munthali, Singh, and Woog (2007) assessed the impact of psychosocial factors such as embarrassment and fear, and structural factors such as financial cost of condoms, on adolescent sexual behaviour trends in Ghana, Burkina Faso, Malawi, and in Uganda. Biddlecom et al. (2007) reported that compared with financial cost of condoms, embarrassment was substantially preventing many adolescents from obtaining condoms as well as from using STD treatment services. Based on their findings, the authors advocated the reduction of social barriers such as embarrassment to condom acquisition among young people in these countries. As a result, adolescents rarely discuss their sexual encounters with their friends for fear that this information might be divulged to their parents, teachers, and significant others. Other research on HIV/AIDS-related stigma and discrimination in three sub-Saharan African countries (i.e., Tanzania, Zimbabwe, and South Africa) and in northern Thailand revealed that HIV-related stigma such as negative attitudes towards people living with HIV was preventing many people from taking voluntary HIV tests and from discussing HIV-related issues (Genberg et al., 2009).

Relatedly, the secrecy surrounding sexual activity involving high school students also derives from the punishments that await students who engage in sexual activity while enrolled in school. Clearly, these prevailing cultural and societal restrictions on adolescent sexual behaviour in the current study's setting render sexual relations among youths strictly private and confidential affairs (Darteh,

Doku, & Esia-Donkoh, 2014). The secrecy surrounding African sexualities has been well documented elsewhere (Tamale, 2011a; Tamale, 2011b; Gune & Manuel, 2011).

Pathway Between Perceived Behavioural Control and Intention

The present study did not confirm the longitudinal relationship between perceived behavioural control over condom use and intention to use condoms. This result is comparable to that reported by a previous panel study (Reinecke et al., 1996). Whereas the present study used three waves of data and three months interval between measurements, Reinecke et al.'s (1996) panel study used two waves of data with a one-year interval between measurements. Note, however, that the longitudinal findings of the current study are contrary to previous cross-sectional work among Tanzanian high school students, which found perceived behavioural control to have accounted for the largest variance in intentions to use condoms (Lugoe & Rise, 1999; Schaalma et al., 2009). From the present research, it remains unclear why perceived behavioural control seems to be a strong predictor cross-sectionally but not longitudinally. Recall that, as with previous cross-sectional results reported in the TPB literature, the cross-sectional structural analyses at each wave of data collection in the present study revealed strong, statistically significant relationships between perceived behavioural control and intention.

A possible explanation for the conflicting predictive role of perceived behavioural control may be traced to the dyadic nature of sexual behaviour. That is, since sexual intercourse involves two people, it is possible for one partner to perceive greater control to use condoms, but the non-availability of a sex partner or even failure to convince a sex partner regarding the advantages of condom use may prevent this perception of control from being brought to fruition. This explanation ties in well with the argument by Fishbein, Hennessy, Yzer, and Douglas (2003) that condom use, essentially, represents a *behaviour* (to be performed) for young men and a *goal* (to be negotiated) for young women. From this reasoning, it seems probable that, whereas some male students may perceive control to perform the

condom use behaviour, the performance of this behaviour may not be one of the important goals of their female sex partners and vice versa.

In a sexual behaviour study among 13,895 high school students in China, Ong et al. (2013) revealed that students who perceived their academic performance to be poor engaged more frequently in sexual risk-taking behaviour. Arguably, non-performing students may perceive less behavioural control over condom use as a result of the lack of clear future goals; some may even desire pregnancy in order to use it as an excuse to drop out of school. Relatedly, a female student may have a goal to engage in only protected sexual behaviour, however a male sex partner who wishes to test his ability to make a girl pregnant and thereby prove his masculinity may refuse to use a condom. Therefore, one's sex partner's cooperation is a central aspect of condom negotiation. This belief reinforces the notion held by most sexual behaviour researchers that condom use requires more than an individual sex partner's volitional control.

Another possible barrier to the execution of the perception of behavioural control relative to participants in this study is the non-availability of condoms. Senior high school students in Ghana (including the present sample) do not have access to free condoms on their school campuses and in their communities. Consequently, it may take more than just the perception of behavioural control to purchase condoms from a community pharmacy (Awusabo-Asare, Abane, & Kumi-Kyereme, 2004) in a society with entrenched social stigma about adolescent sexual behaviour (Asampong, Osafo, Bingenheimer, & Ahiadeke, 2013). A potential adolescent condom user also requires courage and financial resources to purchase condoms. As a result, some young people may feel they would be embarrassed by pharmacists when they try to purchase condoms; or they may even think that the pharmacist may relay information to their parents or teachers regarding the condoms they have purchased (Awusabo-Asare et al., 2004; Beyeza-Kashesya et al., 2011; Meekers & Klein, 2002; Sarkar,

2008). It is most probable that their parents or teachers may be purchasing condoms from the same community pharmacy.

Relatedly, in eastern Ghana, as in much of Ghana, social norms encourage a sense of community (Andoh-Arthur, 2011) because community members usually hail from a common ancestry and they belong to the same clan. Therefore, community members tend to perceive one another as brothers and sisters (one another's keeper; better known in South Africa as *Ubuntu*). This sense of community explains why the axiom that "it is an individual who gives birth, but it is a community that cares for the child" is so popular among Ghanaians. Moreover, extended family housing is very common in eastern Ghana, as in much of Ghana, and many young people receive parental consent to leave home and cater for themselves only when they are married or only for purposes of work, in which case they are considered grown-ups (Ghana Statistical Service [Census 2010], 2013). Furthermore, existing socio-cultural norms instil that young women are never *grown-up* and thus, they do not *qualify* to leave their parental home until they are married (Asampong et al., 2013; Kumi-Kyereme, Awusabo-Asare, Biddlecom, & Tanle, 2007). From this research, it seems obvious that purchasing and keeping condoms as an adolescent in such homes and community settings with potentially prying adult eyes requires more than just the perception of behavioural control.

Added to this, a cross-national study in sub-Saharan Africa (Ghana, Burkina Faso, Malawi, and Uganda) among young people aged 12-19 years revealed that across these countries unmarried young people, especially adolescent women, were under constant monitoring by their parents to prevent them from engaging in sexual activity (Biddlecom, Awusabo-Asare, & Bankole, 2009). The authors also observed that adolescent men and women, who received less parental monitoring, were more likely than their counterparts with high parental monitoring to drift into early sexual behaviour. As can be expected, this kind of youth sexual behaviour "surveillance" by parents may hinder young people's desire to muster courage and to be in control of their sexual behaviour. For the current study, it is

probable that this situation may be leading to a perception of behavioural difficulty instead of control among participants. Correspondingly, in explaining why empirical support for the postulated relations of the TPB components is mixed, Ajzen and Fishbein (2004) argued that the relative importance and weights of the TPB's components were susceptible to sample and setting characteristics. Ajzen and Fishbein (2004) stated:

> We have noted repeatedly that the relative importance of attitudes, subjective norms, and perceptions of behavioral control for the prediction of intentions is expected to vary from behavior to behavior and population to population. The three theoretical antecedents should be sufficient to predict intentions, but only one or two may be necessary in any given application. (p. 431)

Pathway Between Intention and Behaviour

The hypothesised longitudinal relationship between intentions to use condoms and condom use behaviour was not supported in the present study. This result is consistent with other structural equation modelling investigations of condom use that reported nonsignificant longitudinal associations between intentions and behaviour (Carvajal, Estrada, & Estrada, 2005), although this study contrasts with Carvajal et al.'s (2005) study in terms of sample and study design. Other studies have shown that condom use intention is affected by post-intention factors such as the intentions of both sex partners (de Visser & Smith, 2004). In the present study, four possible explanations are provided for this nonsignificant result. First, the disconfirmation of the intention-behaviour longitudinal pathway in the present study may not be surprising after all, given prior national sentinel surveys, demographic and health surveys, and other research indicating low rate of condom use among young people in Ghana

(Acquah, 2014; Adih & Alexander, 1999; Ghana Aids Commission, 2012; Morhe et al., 2012; Ohene & Akoto, 2008).

Second, given the Ghanaian school setting where adolescent sexual behaviour is proscribed to the extent that pregnant students are often excluded from school (Ghana News Agency, 2014b), it is most likely that students with intentions to engage in protected sexual behaviour may not have adequate time to undertake preparatory behaviours such as purchasing condoms for an intended sexual activity, for fear this preparatory behaviour may expose them to school authorities. This situation may serve to attenuate the effect of behavioural intentions to use condoms on self-reported condom use behaviour.

Third, it may be possible that the present sample possesses existing characteristics of high intention (high intenders). It is important to note that the present sample, as in-school adolescents, clearly, may already hold high intentions to practise safe sex, given their own personal academic goals and the expectations of their parents and of significant others. This possibility is supported by the relatively high mean scores on the intention construct by both male and female study participants across all three time points of data. Interestingly, previous research has revealed that individuals with pre-existing characteristics of high intentions experience poor intention-behaviour correspondence (Fishbein et al., 2003). This research suggests that only individuals with extremely high intentions (i.e., above an average level of intentions) are most likely to act on their intentions over time. Furthermore, in an attempt to explain why some people act on their intentions but not others, Fishbein et al. (2003) suggested that:

> Although intention is viewed as the primary determinant of behaviour, the model recognizes that a lack of skills (or abilities) and/or environmental constraints may prevent one from acting on his or her intentions. Thus, intentions alone are not the sole determinant of behavior, and different factors may attenuate or enhance the intention/behaviour relationship. (p. 3)

Fourth, it may well be the case that since two of the three key components of the TPB that jointly affect intention formation, specifically subjective norms and perceived behavioural control, failed to reach statistical significance longitudinally in the current study, that result may have had a cascading effect on the intention-behaviour causal link. The salience of attitudes, subjective norms, and perceived behavioural control to behaviour is inherent in the TPB model. Therefore, attitudes, subjective norms, and perceived behavioural control are thought to indirectly affect behaviour through their direct effect on intention. Interestingly, the current longitudinal data showed that past condom use behaviour emerged as the most accurate and robust predictor of future condom use behaviour (see Figure 8, for parameter estimates of Time 1 behaviour to Time 2 behaviour and to Time 3 behaviour in the autoregressive model).

Put another way, the current results revealed that the strongest predictor of future behaviour was not intention, as postulated by the TPB framework, but rather past experience or past behaviour. This finding provides some support for the popular maxim that "experience is the best teacher". One possible explanation why past behaviour/experience appears to be a robust predictor of future behaviour may be that with previous experience, individuals tend to benefit from hindsight. Not surprisingly, experiences with sexual behaviour and condom use may serve to considerably equip individuals with skills training and reinforcement. Thus, it does not seem difficult to understand why sexual behaviour and, indeed, condom use may be susceptible to past experience. As an example, a past experience with condom use may serve to erase acquired hedonistic beliefs and other myths about condoms and to increase pro-condom use attitudes and intentions.

Gender and Condom Use

In the present study it was found that gender influenced senior high school youths' condom negotiation relative to the TPB components. This finding compares favourably with previous research among adolescents (Farmer & Meston, 2006; Molla et al., 2007; Munoz-Silva et al., 2007; Robertson et al., 2006). In this study, specifically, compared with female students, male students had more favourable attitudes towards condom use and they perceived slightly greater control over condom use. Also, male students reported more condom-protected sexual behaviour than did female students (see Tables 8, 9, and 10). This finding provides some support for the belief held by Fishbein et al. (2003) that condom use represents a *goal* for women and a *behaviour* for men. The reported popularity of the male latex condom among both men and women in the sexual behaviour literature further reinforces this notion. The present finding is comparable with other research reporting that female gender was associated with a lower rate of condom use than male gender because of the difficulties associated with purchasing condoms by female gender (Kowleski-Jones & Mott, 1998; Newman & Zimmerman, 2000).

Additionally, consistent with the current results, Molla et al. (2007) also found that among young people in Ethiopia, young men demonstrated more favourable attitudes, perceived greater behavioural control, and had stronger condom use intentions than did young women. Nevertheless, the current results contrast with those reported by Munoz-Silva et al. (2007). Whereas, Munoz-Silva and colleagues (2007) observed that female students demonstrated a higher average on all TPB components than did male students, the current study found the opposite. Specifically, Munoz-Silva et al. (2007) reported that, whereas attitudes predicted female students' intentions to use condoms more strongly than they did with male students, subjective norms and self-efficacy each emerged as influential predictors of male students' intentions to use condoms. These differences in findings across these studies may reflect differences in sample and setting because Munoz-Silva et al.'s (2007) study was

undertaken amongst Spanish and Portuguese university students, whereas the current sample was recruited from senior high schools in eastern Ghana.

Implications of Results

Practical implications. The findings of the present study suggest important practical implications for sexual risk reduction (HIV, STD, and unintended pregnancy) interventions for high school students. The findings highlight opportunities for sexual risk reduction programmes because the majority of respondents were early adolescents between the ages of 16 years and 17 years (54.1%), the age at which the majority of young people in Ghana commence sexual debut (Adu-Mireku, 2003; Morhe et al., 2012). Other recent work in Ghana showed that 49.2% of high school adolescents initiated first sexual intercourse between 13 years and 18 years (Odonkor et al., 2012). From this research, there appears to be an urgent need to design informational and skills training sexual health programmes for in-school youths. These programmes are needed to promote safe sex attitudinal beliefs among students who are already sexually active, and among those who are about to commence sexual debut. Extant literature shows that compared with non-sexually active youths, sexually active youths are more likely to demonstrate risk-taking behaviour and attitudes (Rice et al., 2012; Rink, Tricker, & Harvey, 2007; Ronis & O'Sullivan, 2005).

Importantly, results of the current study revealed that the attitudes of in-school adolescents in eastern Ghana were the one important construct that was most amenable to change (i.e., can be targeted for intervention because of its potential to influence behavioural intentions). This finding has important prevention implications, highlighting the crucial role of school socialisation in adolescent sexual behaviour. Previous work indicates that almost all young people go to school first before they begin to engage in sexual relations (Kirby, 2002). Furthermore, the current result also lends some support to Ajzen's (1991) explanation that the attitude construct plays a pivotal role in the entire TPB structure.

Indeed, attitudes, and attitude formation and change remain a defining characteristic of human health behaviour (Bohner & Dickel, 2011; Crano & Prislin, 2006; Petty, Wegner, & Fabrigar, 1997; Wood, 2000).

Consequently, it seems clear that sexual risk reduction programmes that target the antecedents of attitude formation and activation may help strengthen positive condom use and safe sex attitudes of young people. Having positive attitudes towards condom use is an important first step for sexual behaviour modification. The current results also suggest that school-aged adolescents in eastern Ghana possess attitudinally-controlled intentions. Sheeran, Norman, and Orbell (1999) noted that intentions based on attitudes were stronger predictors of behaviour than were intentions controlled by subjective norms. They also concluded that individuals with attitudinally controlled intentions were people with high self-regulation — individuals who make personal choices devoid of normative influences. Arguably, the possession of attitudinally controlled intentions may be positive for addressing volitional behaviour and dyadic behaviour in important ways.

Therefore, an important intervention approach to bring about attitude modification regarding safe sex behaviours would be to design informational programmes using persuasive messages via the mass media, social media, cell phones, and direct small-group interactions. Such pieces of information may be in the form of posters, leaflets, flyers, text messages, booklets, and social media posts. Others include film shows, drama, sketches, poetry recitals, personal email interactions from trained professionals, and direct periodic informational sessions in sexual assertiveness training and condom use skills training. Throughout these activities, direct contact with condoms is warranted. These experiential activities may most likely help make sex-relevant attitudes more accessible for recall. Consistent with this suggestion, a recent meta-analysis shows that attitudes that emanate from behaviour-relevant information almost always strongly predict actual behaviour (Glasman & Albarracin, 2006).

Relatedly, a recent review noted that theory-guided sexual behaviour interventions that were activity-based, such as role plays, remained crucial to sex education campaigns among young people (Albarracin, Durantini, & Earl, 2006). Given this, the anticipated cumulative effect of these informational prevention campaigns is that they may serve to refine young people's sexual cognitions by altering negative sex values, on the one hand, and by increasing the processing of relevant knowledge about condom use, on the other hand. The assumption is that accurate sexual health knowledge may most likely help deconstruct existing sexual myths and misconceptions about disease transmission. It is also expected that accurate sexual health knowledge may help address attitudinal ambivalence such as an individual's feelings of invulnerability to HIV infection risk. Evidently, attitude modification is thought to be a putative determinant of behaviour modification.

Furthermore, given the potential role of school socialisation in adolescent sexual behaviour (Kirby, 2002), it is likely that targeted informational prevention programmes, undertaken periodically, may help address key antecedents of attitude formation regarding adolescent sexual behaviour among high school students in Ghana. Informational risk-reduction programmes may also help refine any inaccurate sexual health information that adolescents may have obtained from friends or from social media. The formation of positive sexual attitudes among early adolescents may trigger positive intentions to engage in protected sexual behaviour. Once pro-condom attitudes are firmly formed, sexual behaviour modification through condom use skills training may proceed fairly easily (without much resistance). Additionally, given the perspective that individuals with pre-existing high intentions do not normally act on their intentions (Fishbein et al., 2003), the current sample may seem to have already formed high intentions to engage in protected sexual behaviour (via attitude-intention causal link), and only probably hindered by personal and environmental constraints. In view of this, efforts should be made to go beyond the provision of relevant information to condom use skills training.

Moreover, in the light of the finding regarding gender differences in negotiating condom use relative to the TPB components, gender-specific sex education may be crucial. For example, the initial HIV-risk reduction campaigns in eastern Ghana that emphasised condom use (e.g., "if it's not on, it's not in" and "drive protected"—informational HIV-risk reduction messages in Ghana that inform individuals to refuse sex if a sex partner would not use a condom) should be brought back, and if possible be intensified, among male students. This reinvigoration may help consolidate condom use self-efficacy beliefs among male students. For female students, aside from the dissemination of accurate sexual health information and campaigns such as "protect the goal post" and "if it's not on, it's not in"(informational HIV-risk reduction messages in Ghana that encourage condom-protected sexual behaviour), they may most likely benefit more from sex education and interventions that focus on sexual assertiveness training.

Theoretical implications. The current findings, although considered preliminary (being the first of its kind in the TPB literature), have important theoretical implications for the TPB as a social cognition model of human social behaviour. In the present study, attitudes explained variance in intentions to use condoms over time, as postulated by the TPB. Conversely, subjective norms and perceived behavioural control each failed to longitudinally predict intentions to use condoms, contrary to the postulates of the TPB. Also, there was no statistically significant association between intentions to use condoms and self-reported condom use behaviour. These nonsiginificant results are inconsistent with the postulated model relationships of the TPB.

Despite the limited support for the TPB framework in the present study, the current findings do not seem fatal for the TPB as a model of adolescent sexual behaviour. Nevertheless, these longitudinal analyses do raise important theoretical and empirical questions. These theoretical questions relate to the construct validity of some of the TPB components. For example, given the lack of both cross-sectional and longitudinal support for the subjective norm-intention relationship and the lack of gender

differences in normative influences on youth sexual behaviour in this study, it seems obvious that an important future research direction would be to examine and to isolate the sources of normative influence (i.e., friends, partner, siblings, mother, father, teachers, family doctors, and religious leaders others) on Ghanaian youths' sexual behaviour. This approach would give meaning to Fishbein et al.'s, (2003) caution that "it is important in an intervention context to identify which of these specific beliefs [attitude, subjective norm, and self-efficacy] are most highly correlated with intentions and the ability to act on intentions" (p. 11).

The empirical questions reflect the methodological quality of previous tests of the TPB in the extant sexual behaviour literature. The limited support obtained for the postulated relations of the TPB in the current analyses cannot be attributable to measurement artefacts because all the measurement models (CFAs; see Table 11) fitted the data well, and the latent variables exhibited measurement invariance over time, as well as adequate autoregressive stability. Indeed, the present study offered one of the most rigorous methodological and statistical tests of the TPB yet undertaken, as far as the extant TPB literature is concerned. From an empirical perspective, it seems clear that the current results contrast with most previous findings reported in the TPB test literature because of variations in study design, measurement, and analytical strategy. For example, in the present study, latent variable structural equation modelling was used to analyse data, three waves of data were collected, and the autoregressive effects of constructs were partialled out when testing for cross-lagged relationships. It is probable that this study failed to find support for the subjective norm-intention pathway, the perceived behavioural control-intention pathway, and the intention-behaviour pathway because the prior autoregressive effects had been controlled for.

This explanation derives from the results of the cross-sectional structural analyses reported in the present study; where statistically significant associations were found among model components (except subjective norms) primarily because the prior autoregressive effects were not controlled for (such

autoregressive effects cannot be controlled for in cross-sectional research designs). For example, separately across the cross-sectional structural analyses undertaken at Time 1, Time 2, and Time 3 (see Figures 5, 6, and 7), intentions to use condoms adequately predicted self-reported condom use behaviour. These cross-sectional effects notwithstanding, once the autoregressive effects of intentions were controlled for in the longitudinal analyses, the intention-behaviour relationship weakened to nonsignificance. From the current findings, it appears apparent that bias may have attended the reported explained variances of the majority of the TPB tests in the sexual behaviour literature. Strikingly, Reinecke et al. (1996) evaluated their longitudinal research findings by concluding that:

> Had we relied solely on the cross-sectional data available at the end of the 12-month period, we would have been led to the conclusion that the theory of planned behaviour accounts for a substantial amount of variance in intention to use condoms with new sex partners, as well as in actual condom use. (p. 765)

From the aforementioned, it is likely that these methodological artefacts may have exaggerated the actual predictive validity of the TPB as a framework for investigating human sexual behaviour. Therefore, the use of the TPB in sexual behaviour research may benefit from future longitudinal studies with robust statistical analysis techniques. This future research may likely fill the gap in our knowledge regarding the actual predictive efficacy of the TPB in relation to condom use, as suggested by the current findings. Although the finding regarding the strong relationship between past behaviour and future behaviour seemed to contradict the postulates of the TPB, it was not considered surprising in the present study because previous authors have highlighted the central role of past behaviour in determining future behaviour, especially in sexual behaviour research (Albarracin et al., 2001; Ajzen, 1991; Kashima, Gallois, & McCamish, 1994; 1994; Reinecke et al., 1996). Whereas these results call

into question the sufficiency assumption of the TPB, it provides conceptual opportunities for theory refinement. As a result, a refined TPB model that includes past experience may increase the theory's predictive efficacy. In accordance with the current results, other findings from an experimental test of the TPB (using a different health behaviour), questioned the postulated relations between intentions and behaviour because the authors confirmed the determinants of intention formation (as postulated by the TPB), but not the determinants of behaviour (Sniehotta, 2009). Clearly, additional empirical tests of the TPB are warranted.

Study Limitations and Future Research

There are seven limitations associated with the present study that warrant further discussion. First, the sample was recruited from one large municipal, public senior high school out of several public high schools in eastern Ghana (which is only one region out of ten administrative regions in Ghana). Consequently, the present findings may not generalise beyond the present sample. Nevertheless, the patterns and frequency of sexual risk behaviour involving young people in the current study's setting may compare favourably with those from other public high school students reported in the adolescent sexual behaviour literature from other geographical locations in Ghana (Adu-Mireku, 2003; Ghana Aids Commission, 2012; Morhe et al., 2012; Odonkor et al., 2012; Ohene & Akoto, 2008). Future research may benefit from participants drawn from many public and private senior high schools in eastern Ghana. Future research may also sample participants from selected schools from more than one administrative region, using a cluster system and/or stratified sampling techniques.

Second, the current sample was recruited through a purposive sampling technique (Onwuegbuzie & Leech, 2007), a non-probabilistic sampling technique. Nonetheless, this recruitment approach was not expected to affect the results in any important way because the main focus of this research was to test the predictive ability of the TPB. Thus, the success of the theory's empirical test in this novel

African context was considered the primary contribution of this study to the TPB literature and not necessarily the statistical generalisation of its findings.

Third, there are two main types of condom recommended for sexual risk reduction such as the risk of HIV, STD, and of unintended pregnancy (Basarge, 2007; Gallo et al., 2006; Macaluso et al., 2007; Williams & Fortenberry, 2011). These include the the female latex condoms and the male latex condoms (Motsoane et al., 2003; Shoupe, 2006; Warner & Stone, 2007). In the present study, the generic term "condom" was used to refer to both, although the male latex condom was the main focus of this study. The present study focused on the male latex condom because previous research in Ghana showed that the main condom patronised by both young men and young women in Ghana was the male latex condoms (Abdul-Rahman et al., 2011; Awusabo-Asare et al., 2006; Opoku, 2010).

Fourth, as with several prior studies reported in the adolescent sexual behaviour literature, the data reported in this study were obtained through self-report measures. Although it is well known that bias may attend self-report measures, especially when private sexual information is sought, a growing body of research has shown that the use of self-report in sexual behaviour research does not constitute a major problem (Brener, Billy, & Grady, 2003; DiClemente, Swartzendruber, & Brown, 2013; Goldberg, Haydon, Herring, & Halpern, 2014; Schroder et al., 2003; Vanable et al., 2009). In addition, the adequate autoregressive stationarity demonstrated by the constructs indicated that the TPB components were relatively stable over time, ruling out any possible biases in the self-reported data used.

Related to this, social desirability bias does not seem to have influenced the current self-report data. A closer inspection of the mean scores of the five TPB components examined in this study showed that they did not demonstrate any ceiling or floor effects (Hessling, Schmidt, & Traxel, 2004; Hessling, Traxel, & Schmidt, 2004). As you can see in Table 4 (in the Results chapter), the mean scores are generally in the mid-range across all the three measurement occasions. For example, the

mean scores for the TPB components at Time 1 are as follows: attitudes towards condom use (M = 5.64), subjective norms regarding condom use (M = 5.55), perceived behavioural control over condom use (M = 5.25), behavioural intentions to use condoms (M = 5.59), and self-reported condom use behaviour (M = 2.91). Similar patterns of mean scores have been reported at Time 2 and Time 3.

Fifth, a potential limitation to note when attempting to extrapolate these results is the temporal time lag between measurement occasions. Systematic reviews of the TPB literature indicated that time lags of three months were the most appropriate (Noar et al., 2006; Sheeran & Abraham, 1994). Whereas time lags that are too long may reduce the potential effect of one variable on another to nonsignificance, time lags that are too short do not provide enough time for the effect of one variable on another to manifest (Gollob & Reichardt, 1987; Reichardt, 2011). Given that the participants in the present study were in-school adolescents, it is possible that the intention-behaviour relationship did not reach statistical significance because the three-month interval between measurement occasions was insufficient for behavioural intentions towards condom use to impact actual condom use behaviour. In view of this, a longer time lag (e.g., 6 months) would, probably, have been more appropriate for students, given the school calendar and overt sexual behaviour restrictions in the Ghana school system. The possibility is that with longer time lags, a longitudinal association between intentions and behaviour may have been detected in this study. Future research should, therefore, explore the potential effect of temporal lags on condom use intentions and behaviour of young people in Ghana.

Sixth, the current study used global constructs (i.e., attitude, subjective norm, and perceived behavioural control) to investigate condom use in this novel African setting (Ghana) and population group (senior high school students). The TPB test literature may benefit from future research that employs differentiated/decomposed constructs (e.g., affective versus instrumental attitudes, injunctive versus descriptive norms and self-efficacy versus perceived difficulty; Carmack & Lewis-Moss, 2009; Hagger & Chatzisarantis, 2005). Furthermore, future research may employ multiplicative terms

(behavioural beliefs × evaluations of behavioural outcomes = attitude; normative belief × motivation to comply = subjective norm; and control beliefs × perceived power = perceived behavioural control).

Seventh, given the limited support obtained in the present study for the TPB components, future research may focus on clarifying the intention-behaviour correspondence longitudinally, using appropriate study designs and more robust and advanced statistical techniques. A possible study design that may prove useful in teasing apart the causal link between intentions and behaviour is that of an experimental study (or randomised control trial), where one student group is exposed to free condoms and condom use skills training, a second group of students may receive informational sex education but no free condoms and skills training at all, and a third group of students may comprise a control group that does not receive any of the conditions/treatments mentioned earlier. This research may further our current understanding of the psychosocial constraints preventing adolescents from acting on their intentions. Arguably, an immediate next step may be to replicate and to validate the current findings in a sample of public high school students drawn from a cluster of schools in eastern Ghana. Should this be undertaken, it will likely help increase our confidence in the current results.

Conclusions

The primary goal of the present study was to examine the efficacy of the TPB in predicting young people's intentions to use condom and condom use behaviour over time, using latent variable structural equation modelling. Despite the limited support for the hypothesised relationships, results suggest the TPB provides a fairly robust framework to help understand adolescent sexual cognitions and to inform the design of adolescent sex education campaigns in eastern Ghana. Model fit statistics were generally very good for both autoregressive and cross-lagged longitudinal models, confirming the general structure of the basic TPB model. No model modifications were required to obtain good model-data fit. Results revealed attitudes as the most important predictor of young Ghanaians' intentions to engage in

condom-protected sexual behaviour. This finding highlights opportunities for adolescent sexual risk reduction sex education. Thus, the current research further extends the predictive validity of the TPB to yet another African context.

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APPENDICES

Appendix A

Health Ethics Research Committee of Stellenbosch University's Approval Letter (South Africa)

Approval Notice
New Application

21-Aug-2012
Teye-Kwadjo, Enoch E
Stellenbosch, WC

Ethics Reference #: S12/06/179
Title: Testing the theory of planned behaviour in predicting condom use in eastern ghana: A three-wave longitudinal study.

Dear Mr Enoch Teye-Kwadjo,

The **New Application** received on **09-Jul-2012**, was reviewed by members of **Health Research Ethics Committee 1** via Expedited review procedures on **21-Aug-2012** and was approved.
Please note the following information about your approved research protocol:

Protocol Approval Period: **21-Aug-2012 -21-Aug-2013**

Please remember to use your **protocol number** (**S12/06/179**) on any documents or correspondence with the REC concerning your research protocol.

Please note that the REC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

After Ethical Review:
Please note a template of the progress report is obtainable on www.sun.ac.za/rds and should be submitted to the Committee before the year has expired.
The Committee will then consider the continuation of the project for a further year (if necessary). Annually a number projects may be selected randomly for an external audit.
Translation of the consent document in the language applicable to the study participants should be submitted.

Federal Wide Assurance Number: 00001372
Institutional Review Board (IRB) Number: IRB0005239

The Health Research Ethics Committee complies with the SA National Health Act No.61 2003 as it pertains to health research and the United States Code of Federal Regulations Title 45 Part 46. This committee abides by the ethical norms and principles for research, established by the Declaration of Helsinki, the South African Medical Research Council Guidelines as well as the Guidelines for Ethical Research: Principles Structures and Processes 2004 (Department of Health).

Provincial and City of Cape Town Approval

Please note that for research at a primary or secondary healthcare facility permission must still be obtained from the relevant authorities (Western Cape Department of Health and/or City Health) to conduct the research as stated in the protocol. Contact persons are Ms Claudette Abrahams at Western Cape Department of Health (healthres@pgwc.gov.za Tel: +27 21 483 9907) and Dr Helene Visser at City Health (Helene.Visser@capetown.gov.za Tel: +27 21 400 3981). Research that will be conducted at any tertiary academic institution requires approval from the relevant hospital manager. Ethics approval is required BEFORE approval can be obtained from these health authorities.

We wish you the best as you conduct your research.
For standard REC forms and documents please visit: www.sun.ac.za/rds

If you have any questions or need further help, please contact the REC office at 0219389657.

Included Documents:
Checklist
Consent Form
Investigators declaration
Synopsis
Supervisors declaration
Application form

Sincerely,

Franklin Weber

Appendix B

Institutional Review Board of the Noguchi Memorial Institute for Medical Research's Approval Letter (Ghana)

NOGUCHI MEMORIAL INSTITUTE FOR MEDICAL RESEARCH
Established 1979 *A Constituent of the College of Health Sciences*
University of Ghana

INSTITUTIONAL REVIEW BOARD

Phone: +233-302-916438 (Direct)
+233-302-501178 Ext 287
Fax: +233-302-502182/513202
E-mail: nirb@noguchi.mimcom.org
Telex No: 2556 UGL GH

Post Office Box LG 581
Legon, Accra
GHANA

My Reference: DF 22

Your Reference:

14th November, 2012

ETHICAL CLEARANCE

FEDERALWIDE ASSURANCE FWA 00001824 **IRB 00001276**

NMIMR-IRB CPN 034/12-13 **IORG 0000908**

On 14th November 2012, the Noguchi Memorial Institute for Medical Research (NMIMR) Institutional Review Board (IRB) at a full board meeting, reviewed and approved your protocol:

TITLE OF PROTOCOL : **Testing the Theory of Planned Behaviour in Predicting Condom Use in Eastern Ghana: A Three-Wave Longitudinal Study**

PRINCIPAL INVESTIGATOR : **Enoch Teye-Kwadjo (PhD Candidate)**

Please note that a final review report must be submitted to the Board at the completion of the study. Your research records may be audited at any time during or after the implementation.

Any modification of this research project must be submitted to the IRB for review and approval prior to implementation.

Please report all serious adverse events related to this study to NMIMR-IRB within seven days verbally and fourteen days in writing.

This certificate is valid till 13th November, 2013. You are to submit annual reports for continuing review.

Signature of Chairman: .....
Rev. Dr. Samuel Ayete-Nyampong
(NMIMR – IRB, Chairman)

cc: Professor Kwadwo Koram
Director, Noguchi Memorial Institute
for Medical Research, University of Ghana, Legon

Appendix C

Ghana Education Service's Permission Letter.

GHANA EDUCATION SERVICE

In case of reply, the number and date of this letter should be quoted.

Your Ref.
My Ref. No.SS.186/01/131

HEADQUARTERS
Ministry Branch Post Office
P.O. Box M45
Accra

31ST October, 2012

TO WHOM IT MAY CONCERN

PERMISSION TO CONDUCT RESEARCH AMONG SENIOR HIGH SCHOOL STUDENTS IN SELECTED SCHOOLS IN EASTERN GHANA
ENOCH TEYE-KWADJO

Mr. Enoch Teye-Kwadjo is a doctoral student at Stellenbosch University, Department of Psychology, South Africa.

He is asking for permission to conduct his study in selected schools in the Eastern region of Ghana.

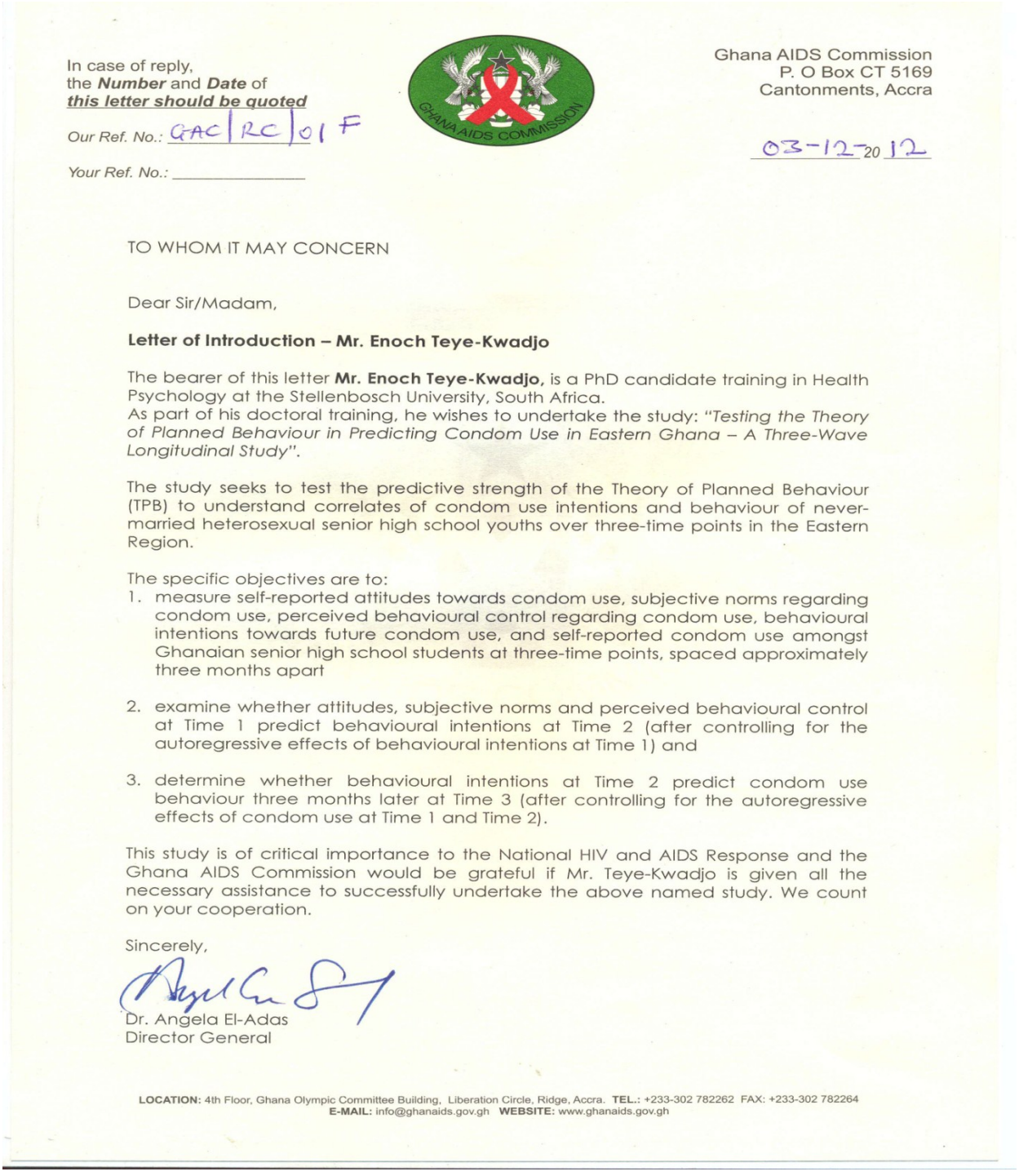
Permission has been granted, Mr. Enoch Teye-Kwadjo to conduct his study in selected schools.

Kindly give him the needed assistance to enable him successfully conduct the study.

E.L. OCANSEY
DEPUTY DIRECTOR
SECONDARY EDUCATION DIVISION
(FOR: DIRECTOR GENERAL)

Appendix D

Ghana Aids Commission's Introductory Letter



In case of reply,
the ***Number*** and ***Date*** of
this letter should be quoted

Our Ref. No.: GAC/RC/01 F

Your Ref. No.: _____

Ghana AIDS Commission
P. O Box CT 5169
Cantonments, Accra

03-12-2012

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

Letter of Introduction – Mr. Enoch Teye-Kwadjo

The bearer of this letter **Mr. Enoch Teye-Kwadjo,** is a PhD candidate training in Health Psychology at the Stellenbosch University, South Africa.
As part of his doctoral training, he wishes to undertake the study: *"Testing the Theory of Planned Behaviour in Predicting Condom Use in Eastern Ghana – A Three-Wave Longitudinal Study"*.

The study seeks to test the predictive strength of the Theory of Planned Behaviour (TPB) to understand correlates of condom use intentions and behaviour of never-married heterosexual senior high school youths over three-time points in the Eastern Region.

The specific objectives are to:

1. measure self-reported attitudes towards condom use, subjective norms regarding condom use, perceived behavioural control regarding condom use, behavioural intentions towards future condom use, and self-reported condom use amongst Ghanaian senior high school students at three-time points, spaced approximately three months apart

2. examine whether attitudes, subjective norms and perceived behavioural control at Time 1 predict behavioural intentions at Time 2 (after controlling for the autoregressive effects of behavioural intentions at Time 1) and

3. determine whether behavioural intentions at Time 2 predict condom use behaviour three months later at Time 3 (after controlling for the autoregressive effects of condom use at Time 1 and Time 2).

This study is of critical importance to the National HIV and AIDS Response and the Ghana AIDS Commission would be grateful if Mr. Teye-Kwadjo is given all the necessary assistance to successfully undertake the above named study. We count on your cooperation.

Sincerely,

Dr. Angela El-Adas
Director General

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Appendix E

Alpha-Numeric String Identifier Generation Guide for Study Participants

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PARTICIPANT SELF-GENERATED ALPHA-NUMERIC STRING IDENTIFIER GUIDELINE

Step 1: Please write down the **INITIALS** of your full name {e.g., **ETK** for *Enoch Teye-Kwadjo* = **ETK**):_____

Step 2: Count the number of **letters** in your **SURNAME** and add it to your *initials* in **Step 1** (e.g., **10** for *Teye-Kwadjo* = **ETKI0**):_____

Step 3: Add the first letter of your mother's **FIRST NAME/CHRISTIAN NAME** to the code in **Step 2** (e.g., **Y** for *Yutilivia* = **ETKI0Y**):_____

Step 4: Record the **DAY** and **MONTH** of your birth date and add this **4 digit figure** to your code in **Step 3**. Do not add the YEAR you were born. If the **DAY** or **MONTH** you were born is only ***1 digit***, please place a '**0**' in front of it. (e.g., if you were born on *5TH SEPTEMBER,* you should record it as "**0509**" (DD MM) = **ETKI0Y0509**):_____

Please record your **final secret code or identifier** at **Step 4** at the ***front cover page*** of the ***survey*** you have completed before handing in the survey to the research assistants. If you have any questions, please ask the principal investigator.

Thank you

Appendix F

Survey Questionnaire

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PRINCIPAL INVESTIGATOR: Enoch Teye-Kwadjo (BA [Hons]; MPhil)

LEAD SUPERVISOR: Prof. S. A. Kagee

CO-SUPERVISOR: Dr. H. Swart

SURVEY QUESTIONNAIRE

INFORMATION FOR THE STUDY PARTICIPANT

Thirty (30) Minutes of Your Time Can Help Improve Adolescent Health Services

Thanks for taking 30 minutes of your time to fill out this survey. **Please do not put your name anywhere on this paper**. This survey assesses how young people protect themselves from HIV, STDs, and unintended pregnancy.

The information in this survey is not given to anyone else not associated with the study. **The information you provide would be treated in strictest confidence and would be used for only academic purposes.** This survey is being conducted as part of a PhD programme in Health Psychology.

Please answer all questions (A to G) even if you think you are not sexually active. I am only interested in how you plan to protect yourself from HIV, STDs, and unintended pregnancy now or in the future. Answer all questions honestly.

Please ask the principal investigator any questions about any part of this survey that you do not fully understand. **Again, do not put your name anywhere on this survey.**

Please indicate the degree to which you agree with the following statements in sections **A, B, C,** and **D**. Please mark like this ⊗ in the boxes provided. Mark only one checkbox for each statement. No answer is wrong or right:

(A) Attitude Towards Condom Use	Strongly disagree	Disagree	Slightly disagree	Neither disagree nor agree	Slightly agree	Agree	Strongly agree
I believe condoms should always be used if a person my age has sex. 1	1	2	3	4	5	6	7
I am in favour of using condoms. 2	1	2	3	4	5	6	7
I believe condoms should always be used if a person my age has sex, even if the girl uses birth control pills. 3	1	2	3	4	5	6	7
Sex is unnatural with condoms. 4	1	2	3	4	5	6	7
The idea of using condoms appeals to me. 5	1	2	3	4	5	6	7
Condoms prevent pregnancy. 6	1	2	3	4	5	6	7
I believe condoms should always be used if a person my age has sex, even if the two people know each other very well. 7	1	2	3	4	5	6	7
Condoms get in the way of sex. 8	1	2	3	4	5	6	7
Condoms prevent HIV/AIDS. 9	1	2	3	4	5	6	7
Condoms prevent STDs. 10	1	2	3	4	5	6	7
It is fine for a girl to refuse sex if a boy won't use a condom. 11	1	2	3	4	5	6	7
It is fine for a boy to refuse sex if a girl won't use a condom. 12	1	2	3	4	5	6	7
(B) Subjective Norms							
Most of my friends believe condoms should always be used if a person my age has sex. 1	1	2	3	4	5	6	7
Most of my friends will talk about condoms with a boyfriend or girlfriend. 2	1	2	3	4	5	6	7
Most of my friends believe condoms should always be used if a person my age has sex even if the two people trust each other very well. 3	1	2	3	4	5	6	7
If I had sex and I told my friends that I did not use condoms, they would be disappointed. 4	1	2	3	4	5	6	7
Most of my friends believe condoms should be used if a person my age has sex, even if the girl uses birth control pills. 5	1	2	3	4	5	6	7
Most of my friends will say "no" to sex if a boyfriend or girlfriend won't use a condom. 6	1	2	3	4	5	6	7
Most of my close friends use condoms when they have sex with a boyfriend or girlfriend. 7	1	2	3	4	5	6	7

	Strongly disagree	Disagree	Slightly disagree	Neither disagree nor agree	Slightly agree	Agree	Strongly agree
My friends talk a lot about "safer" sex. 8	1	2	3	4	5	6	7
(C) Perceived Control Over Condom Use							
I can use a condom correctly. 1	1	2	3	4	5	6	7
I can say to my boyfriend or girlfriend that we should use a condom. 2	1	2	3	4	5	6	7
It is hard to get condoms. 3	1	2	3	4	5	6	7
If I am aroused, I can stop before sex to use a condom. 4	1	2	3	4	5	6	7
I can use a condom without breaking the sex mood. 5	1	2	3	4	5	6	7
I can use a condom, even if the room is dark. 6	1	2	3	4	5	6	7
I can get my boyfriend or girlfriend to use a condom, even if he or she does not want to do so. 7	1	2	3	4	5	6	7
If I have a condom, my boyfriend or girlfriend would like it. 8	1	2	3	4	5	6	7
I am sure that I can use a condom when I have sex. 9	1	2	3	4	5	6	7
It is easy to carry condoms. 10	1	2	3	4	5	6	7
(D) Intentions To Use Condoms In The Future							
If I were going to have sex in the next 3 months, I would take steps to reduce my risk for HIV and STDs. 1	1	2	3	4	5	6	7
I will make sure a condom is used when I have sex in the next 3 months. 2	1	2	3	4	5	6	7
In the next 3 months, I will not have sex with someone who refuses to use a condom. 3	1	2	3	4	5	6	7
I intend to follow condom use guidelines within the next 3 months. 4	1	2	3	4	5	6	7
If I were going to have sex in the next 3 months, I planned to use condoms. 5	1	2	3	4	5	6	7
It is very likely that I will use condoms if I have sex in the next 3 months. 6	1	2	3	4	5	6	7
I am determined to practice condom use in the next 3 months if I have sex. 7	1	2	3	4	5	6	7
I would use them, if I were given free condoms in the next 3 months. 8	1	2	3	4	5	6	7

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(E) Self-reported Condom Use	Never	Almost never	Sometimes	Quite often	Often	Very often	Always
Please indicate your condom use patterns:							
How often have you had sex with your regular boyfriend or girlfriend with a condom in the past 3 months? 1	1	2	3	4	5	6	7
How often have you had sex with your regular boyfriend or girlfriend without a condom in the past 3 months? 2	1	2	3	4	5	6	7
How often have you had sex with someone who is not your boyfriend or girlfriend with a condom in the past 3 months? 3	1	2	3	4	5	6	7
How often have you had sex with someone who is not your boyfriend or girlfriend without a condom in the past 3 months? 4	1	2	3	4	5	6	7
How often did you insist that you or your boyfriend or girlfriend use a condom when during sex in the past 3 months? 5	1	2	3	4	5	6	7
How often did you forget to remind your boyfriend or girlfriend to use a condom during sex in the past 3 months? 6	1	2	3	4	5	6	7
How often did you refuse to have sex with a partner because they would not use a condom in the past 3 months? 7	1	2	3	4	5	6	7
How often are you the person that has to suggest or insist on using a condom before sex in the past 3 months? 8	1	2	3	4	5	6	7
How often do you feel that it is your duty to ensure that you and your boyfriend or girlfriend use a condom during sex in the past 3 months? 9	1	2	3	4	5	6	7
How often are you the one that provides the condom when you and your boyfriend or girlfriend have sexual intercourse in the past 3 months? 10	1	2	3	4	5	6	7

(F) Background Variables

Please answer some few questions about HIV, STDS, and pregnancy:

	Yes	No	Don't Know
Can a person have HIV and not show signs of any disease? 1	Y	N	DK
Do you know of a friend your age who ever got pregnant? 2	Y	N	DK
Can a pregnant woman give HIV to her baby? 3	Y	N	DK
Have you been personally diagnosed of STDs like syphilis or gonorrhea before? 4	Y	N	DK
Do you worry that you might get an HIV infection? 5	Y	N	DK

	Yes	No	Don't know
Do you have friends your age who have had sex before? 6	(Y)	(N)	(DK)
Do your friends who have sex use condoms? 7	(Y)	(N)	(DK)
Have you ever given or received money for having sex with someone? 8	(Y)	(N)	(DK)
Have you ever had sex with a girl? 9	(Y)	(N)	(DK)
Have you ever had sex with a boy? 10	(Y)	(N)	(DK)
Have you ever used a condom? 11	(Y)	(N)	(DK)
Do you know someone who died of HIV/AIDS? 12	(Y)	(N)	(DK)
Do you know someone who is diagnosed of HIV or AIDS? 13	(Y)	(N)	(DK)
Will you be happy to take an HIV test to know your status? 14	(Y)	(N)	(DK)
Are people your age too young to get an HIV infection? 15	(Y)	(N)	(DK)
Are you currently using any birth control method? 16	(Y)	(N)	(DK)

(G) Demographic Information

Please answer a few questions about yourself:

What is your gender? 1	Female (1)	Male (2)	
What is your age range (years)? 2	14-15yrs (1)	16-17yrs (2)	18-20yrs (3)
What is your student status? 3	Day student (1)	Boarding student (2)	

Please, write any comments, explanations, and/or suggestions you may have in the box below

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Appendix G

Some Study Participants Completing the Surveys

(Author's own shots taken during data collection)